TENTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

NEW YORK.

TRANSMITTED TO THE LEGISLATURE FEBRUARY 20, 1890.

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STATE OF NEW YORK:

EXECUTIVE CHAMBER,
ALBANY, *February* 20, 1890.

To the Legislature:

I have the honor to transmit herewith the annual report of the State Commissioners of Health for the year 1889.

DAVID B. HILL.

STATE BOARD OF HEALTH OF NEW YORK.

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STATE SUPERINTENDENT OF REGISTRATION AND VITAL STATISTICS.

DR. LEWIS BALCH, - - - *As Secretary of the Board.*

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REPORT.

To his Excellency, DAVID B. HILL,

Governor of the State of New York:

SIR.—The State Board of Health presents its Tenth Annual Report, and in doing so states its belief that sanitary work has made substantial progress during the past year. The increased interest taken by localities in perfecting the registration of vital statistics, indicated by the fuller returns to the State Bureau; their activity in attacking and stamping out contagious diseases; the progress in the direction of sewerage and drainage; and the attention given to securing public water supplies from a pure source, are indicative of the trend of public opinion, and show an exaltation in the popular mind of sanitary science that augurs well for the future.

THE PRESENT SANITARY CONDITION OF THE STATE.

The years 1888 and 1889 were free from the unusual prevalence of any epidemic disease, and compare favorably with the years that preceded them in respect to salubrity.

From small-pox, which prevailed for about two years, the State has for several months been entirely free. It exists, however, in Ontario, Massachusetts, Connecticut, Michigan, Ohio, Illinois, and not long since appeared in the southwestern States. Scarlet fever, measles, whooping-cough, prevail epidemically, but not in a marked degree.

On the contrary, they are showing a monthly decline in the rate of their mortality. The death rate from diphtheria has steadily declined since early in 1889; and while there was an unusually sharp increase in the number of deaths due to it in October, there has since been a falling off rather than an increase, as is customary when the fall and winter months come on. This is the best gauge of healthfulness, and it is on this disease that the restraining influence of sanitary work brings the most satisfactory result. The time is doubtless coming when, in the less densely populated part of the State, outside of the large cities, diphtheria will come more and more under control, and the mortality from it be steadily diminished.

The present year begins with a novel experience in the prevalence of epidemic influenza. This remarkable pandemic, first heard from in Russia during the closing months of 1889, spread throughout Europe, before the end of the year made its appearance in this country, and will doubtless extend over the habitable surface of the earth. It travels with wonderful rapidity, becomes quickly and universally prevalent, affecting a large proportion of every community, and is likely to disappear as quickly, to remain for years in abeyance. To what it is due we are in the position to affirm or deny but little, and therefore know no means for avoiding it. It is not a filth disease, probably not spread by contagion, and can not be restricted by quarantine. The causes for the epidemic seem to be in the atmosphere. Comparatively mild but varying widely in its severity, it is a compound disease, of which there are but few examples, being composed of an essential fever and a local inflammation of the mucous surfaces, generally the respiratory. While acute in its course

and transient in its effects in the majority of cases, many old people, or those weakened by other diseases, will be seriously and some fatally affected by it, and others will die from secondary pneumonia and bronchitis. It will contribute largely, without doubt, to the death rate of January in this State. While, soon doubtless coming to an end, this epidemic of of "Grippe," as it is popularly called by the adoption its suggestive French name, will not soon be forgotten.

GENERAL SANITARY INVESTIGATIONS.

The authorities of several villages have called upon the Board for advice in the matter of sewerage. All possible aid has been given in response to these requests, as they were found to be based upon an understanding of sanitary needs and a desire to find out the best method of procedure. The first was from the board of trustees of the village of Goshen. An engineer was sent to examine into the feasibility of sewering the village and to form a general estimate of the probable cost. On a subsequent visit he presented illustrations and argument as to the local necessity for sewerage at a public meeting of the citizens. Chapter 375 of the Laws of 1889 had not yet become law, and the village proceeded under its charter to vote money to construct sewers, procured plans and specifications and bids for the furnishing of material and the prosecution of the work. Unfortunately some legal questions arose which forced the suspension of proceedings at this point, and the village is still awaiting the settlement of these questions. It is hoped that it will be able to continue the good work early in the spring as it is evidently in need of the relief that good sewerage and drainage will bring.

Greenport, Long Island, through its board of health, called for advice upon the question of sewerage, as a company has lately introduced a system of water-works into the village.

Wellsville, Allegany county, made a similar request, on the ground that a very large tannery above and one or two small sewers emptying into the river in front of the village were producing great nuisances. The engineer sent to make the inspection called the attention of the board of health to chapter 375, and on the same day sewer commissioners were appointed by the board of trustees and the preparation of plans is now in progress. At their request a report on a general plan was made for their guidance, which is printed in the appendix.

The sewer commissioners of Walton wished advice as to a system of sewerage adapted to their conditions and the mode of procedure under chapter 375, of 1889. An inspection of the village showed that a close approximation to the separate system would best fit the case and it was therefore advised. The commissioners are proceeding to the preparation of plans.

Much discussion having arisen in the city of Newburgh concerning an outlet for the sewerage of a portion of that city, the board of health requested the opinion of the State Board. The occurrence of typhoid fever and diphtheria at intervals, as well as the inspection showed a deplorable state of affairs which could not be completely remedied without a system of sewers. Who should defray cost of the necessary long outlet seemed to be the principal question. While the answer must be determined by the vote of the people, the equity of the case, as well as the general practice of corporations,

would indicate that a considerable portion of the expense should be borne by the city at large.

The village of Clinton, Oneida county, has recently been awakened to the desirability of a system of sewerage. The recent introduction of a water supply and the consequent difficulty of disposing of its increased household wastes, the porous character of the soil causing extended distribution of pollution from cess-pools the obnoxious odors arising from open streams, badly ventilated sewers, imperfectly constructed drains and an abandoned canal bed, have been moving causes. The occurrence this fall of a number of cases of diphtheria has increased the desire for a clean village. A public meeting, called to discuss the subject of improved sanitation, requested the presence of an officer of the State Board of Health. An engineer was sent to make an inspection and present at a public meeting the results of his work with argument to show the desirability and necessity of sewerage.

A nuisance in the shape of privies and cesspools connected with a large hotel surrounded by buildings, was the cause of a visit to the village of Norwich. The need of radical changes in the hotel was shown in the report of the inspector. Upon request of the local board of health, an additional report upon the needs of the village as regards sewerage and the possibilities in that direction was prepared. So large and closely built a village as Norwich would under any circumstances ultimately require sewers. While its natural advantages are great they are not sufficient to do away with this necessity for a great length of time, and it is now beginning to show itself in dangerous forms. The desirability of getting rid of nuisances from privies, cesspools, garbage heaps, etc., in a thickly populated village is here

clearly demonstrated. A consideration of the expense of establishing and maintaining the comparatively cheap methods recommended for the hotel when applied to all places where they are needed, and of a system of sewers to do the same work, will demonstrate the economy of the latter.

The occurrence of a few sporadic cases of typhoid fever at Richfield Springs in 1887 and 1888 caused an investigation, at the request of the local board of health, into the sanitary condition of the village. It being a noted health resort, a slight amount of disease of this nature was sufficient to arouse great alarm. The inspection showed an excellent sanitary condition; a good system of sewers in general use, a pure water supply and an energetic board of health. But few points of adverse criticism were found, and those were already in process of improvement and have now all been corrected, so that the former good foundation for the excellent reputation of the village as a health resort is increased in stability. To make assurance doubly sure the village has supplied itself with a modern filtering apparatus to remove from its water supply whatever vegetable pollution it was formerly subject to at intervals.

Conflicting reports as to the sanitary condition of the health resort at the head of Lake George led to a similar inspection upon a like request from the local board of health. The natural advantages of this place and its general sanitary condition were, as in the other case, found to be such as to warrant no alarm or great question of its healthfulness at present. It is, of course, a matter of business for a health resort to leave no chance for even the least objection, and as the present methods of sewage disposal will ultimately result in

unhealthful conditions, it is advisable for Lake George to follow the recommendations of the inspector as to sewerage and water supply.

Nuisances due to defective construction of, wrong outlets for, and lack of enough sewers, in the city of Cohoes, show the necessity for an early determination of the entire question if the public health is to be preserved. The city is unfortunate in having difficult material on which to work, and so many intersecting water channels of irregular flow, but a competent engineer, with power to treat together the problems of the discharge of water from tail-races of mills and the sewerage of the city, can devise an economical plan which need not be prohibitory in cost.

The supposed pollution of a well by a privy vault at Philmont caused an inspection which showed that several wells in the neighborhood were liable to defilement from this and other vaults and cesspools. A system of dry removal, was recommended. The filling of the particular well complained of was also advised, it not being in use and being in a very polluted condition. Another well on the same premises, apparently similar in condition to other wells in the neighborhood, showed signs of contamination, and the necessity of immediately carrying out the recommendations made.

An outbreak of fever of a typho-malarial character among the employés of the car shops of the New York Central and Hudson River Railroad at West Albany assumed large proportions, there being over 300 cases and twenty-five or thirty deaths. An inspection of the premises proved conclusively much sewage pollution of confined ground-water, owing to the leaky condition of the sewers and to the location of the shops upon a swampy site which had been filled without proper

attention to drainage. The researches of Pettenkofer in seeking an explanation of the prevalence of typhoid fever in Munich, have demonstrated in that case for thirty-seven years a clear dependence of the disease in extent and virulence upon the fluctuations of the ground-water, polluted as it was by years of soakage from pits and cesspools. The distribution of enteric fever in Dublin for eight years is shown in a report by Sir Charles A. Cameron, M. D., the superintendent medical officer of health, to depend upon the character of the subsoil, the cases occurring almost exclusively over a gravelly subsoil, periodically saturated with ground-water, owing to its low position and to the height to which the tides rise, the subsoil being polluted by the drainage from other portions of the city which does not enter the sewers, and probably also to some extent by leakage from the sewers during the hours of the day when the sewage is backed up and confined in the outlet sewers by the rise of the tide. The conditions at the West Albany shops are quite similar on a small scale to those at Munich, and it is a reasonable conclusion that the similar disease is due in large part to the similar conditions. The attention of the railroad company has been called to the necessities of the case, and it is understood that a plan for the sewerage and drainage of the shops and yards has been made and that the construction of the works will shortly begin. Instances of lack of traps to sewer connections were noted, permitting the entrance of sewer air into the building, indeed, in some instances forcing its entrance by the warm condition of the air in the shops in the neighborhood of heating apparatus or furnaces. These have already been in part corrected. The use of certain polluted wells as sources of water supply has been prohibited.

The receipt of many complaints regarding the sanitary condition of the shores of the Hudson river was the cause of an inspection of that river during the latter part of the summer. The inspector found many coves along the shores which have been more or less completely cut off from the main river by the railroad embankments of the New York Central and Hudson River, the New York, West Shore and Buffalo, the New York and New England, and the Hartford and Connecticut Western railroads. The railroads were primarily constructed with reference to their own needs as regards drainage, and but little attention, if any, was paid to the sanitary condition of coves which required no openings, or but small openings, through which to discharge surface drainage from the adjoining bluffs. As a consequence, many of these coves have become breeders of considerable nuisance from the accumulation of decaying organic matter. When coves were originally too deep to permit the growth of aquatic vegetation, they were not in bad condition. Some are still in this condition. The wash from the hills, however, in time fills the coves with sufficient soil and debris to give the proper shallowness to allow the growth of aquatic vegetation. In cases where the cove has little or no circulation of water, this vegetation decays upon the spot, and in the course of time fills the cove to a point above low water and produces by this decay considerable odor, and is doubtless often conducive to malarial diseases. Coves of all conditions, from the deep, clean pool to the marsh, are found. There are many portions of the upper river, near the shores, which are shallow and thickly grown up with vegetation, quite as thickly as the portions behind the

railroad embankments. In most of these cases, however, the rise and fall of the tide twice each day carries away the products of decay and thus prevents in large part the production of nuisance, while the confinement of the water behind the railroad embankments prevents this removal of the obnoxious matter and so is productive of nuisance. This fact is exemplified in the difference in the condition of coves on the east and west shores. Both railroads formerly had many trestles across these coves which permitted a free circulation. Most of these trestles on the west shore are still open, and where they are the condition of the coves is, in general, excellent. On both banks of the river, where the trestles have been filled, and nearly all of those on the east bank have been filled, the evil effects of the confinement of the water are manifest. It is quite apparent that it is but a question of time until every cove along the shores, whose circulation is poor, will become as great a nuisance as its size can engender, and the final settlement of every case must be either free circulation of water through large openings or obliteration by filling to a level above high water, with due slopes and openings through the embankments to provide for surface drainage.

Several places near cities and villages are in extremely bad condition from the discharge of sewage or the deposit of refuse and garbage and demand immediate attention. Many places, not so intensified by additional pollution from animal sources, require early attention on account of their extent or proximity to cities, villages or collections of dwellings, or both, while some others will demand attention later, because not so far advanced in their stages of deterioration or

because of remoteness from dwellings. The condition of health of employés of the railroad, whose duties are permanently along some of these portions remote from dwellings, should also be taken into consideration. Some portions of the upper river have been put into a condition much like that of the coves, over quite large areas, owing to the concentration of the channels by dikes, and the consequent slow current and opportunity for deposition of matters in suspension over large areas, cut off from a free circulation by the dikes. The resulting vegetation decays, and the current fails to a certain extent to carry off the products of decay, and thus large areas of river are, and will be for many years, sources of malarial disease. The question is at present practically whether the maintenance of navigation is of sufficient importance to offset the increase in ill health, and to a certain extent in death rate, due to the unsanitary conditions developed, a question which scarcely admits of other than one answer. The expense of a thorough treatment at present of the flats cut off by the dikes is practically prohibitory, but the deposition of new material each year is steadily going on, and is reducing the depth of water more rapidly and surely than it could be done by artificial means, so that, with some judicious assistance to the natural processes by further stoppage or deflection of currents, this process will in time bring the matter within control again and restore the healthfulness of the territory adjoining the marshes.

The Hudson is used as a source of water supply by several cities and villages along its course, and is very prominent as a source of ice supply, so that the preservation of the purity of its waters is a necessity. The engineer of the Board during his inspection tour paid

special attention also to the sources of water supply of the cities and villages on the banks of the river, and to the methods of sewage disposal of these cities and villages, and of others on the tributaries of the river. The water of the river having a greater or less amount of salt in it as far up as Poughkeepsie, is not used as a source of water supply by any corporation below, and the first ice-house deriving its supply from the river is only a few miles below Poughkeepsie. The investigation of sewage pollution began, therefore, at this point. It was soon discovered that the amount of time possible to spend this year was sufficient to make but little progress in this important investigation, and therefore only a partial and very fragmentary report on this portion of the work can be presented at this time. This report is sufficient to show the great importance of the river as a source of water and ice supply; to give some slight indication of the vast amount of polluting materials which now enter the river, and which it is proposed to discharge into the river and its tributaries; and to indicate the desirability of an inspection of the entire water-shed of the river, that full information of the facts can be secured as a basis upon which to found a decision as to what should be done to preserve the river and the vast interests depending upon its purity, on the one hand, and to take care of the present and prospective pollution on the other. The action of the new law for general village sewerage promises to be favorable to the early construction of many new systems of sewers of which the Hudson valley will have its proportion. Several cities upon the Hudson and its tributaries are beginning to be alarmed at the deterioration of their water supplies, and it is now necessary

to decide whether (1) the river shall be used as a common sewer to the destruction of much property, such as water-works, ice establishments, etc., with the consequent search for new water supplies — in some instances extremely difficult to find — and construction of new works, often necessarily experimental in character and therefore expensive, or whether (2) purification of sewage from old and new systems shall be insisted upon, with the attendant expenses of establishing and maintaining such plant. The latter is, without doubt, the proper principle upon which to work in consideration both of the equities of the case and of the relative expenses to be incurred by the one side or the other, and is that upon which those governments who have most studied the subject found their recommendations or requirements. Our neighboring State of Massachusetts is proceeding practically upon this principle in many cases. The English government some time ago fixed definitely upon this method of procedure, to which it still rigidly adheres as experience shows the advantages of so doing.

WATER SUPPLIES.

The first reports of violations of the rules for the preservation for the purity of water supplies have been reported to the office this year. One of Hemlock lake, the reservoir from which the city of Rochester draws its supply, was the first. Inspection by an officer of the Board showed the validity of the claim of violation of rule and the abatement of the trouble was ordered according to law through the board of health of the town in which the violation occurred.

One hundred and forty-two violations of the rules for the protection of the Croton river and its tributaries

have been reported by the commissioner of public works of New York city. All violations reported have been inspected by a representative of the State Board and the lists, with such slight corrections as were necessary, have been transmitted to the boards of health of the various villages and towns in which the premises are located, with instructions to carry out the rules. It is quite evident that the authorities in charge of the water supply of the city of New York are in earnest in their endeavors to improve its sanitary condition, and they are showing a commendable activity in their efforts to this end. Upon most of the territory covered by the inspections a laudable desire is shown by the persons affected by the rules to assist the city in its efforts. Many of the violations reported are rather cases of neglect than of willful refusal to conform to the rules. In some cases the alteration of existing conditions to conform to the rules will be a matter of some expense and the parties affected are reluctant to incur this without a prospect of reimbursement from the party most interested, the city of New York. A hardship would be worked in some cases if this were insisted upon, but there is almost no instance in which compliance with the rules will not benefit residents upon the watershed as well as the city, and the manifestation of a proper spirit will, doubtless bring about an equitable division of the outlay.

While Esopus creek is not the regular potable water supply of the village of Saugerties at present, it is used by a number of families and by mill operatives, and there is a possibility of its being taken for the entire village. The villagers were sufficiently interested in preserving its purity to call the attention of the State

Board to the proposed pollution by the city of Kingston; and upon requests of numerous citizens, as well as of the board of health of the village, two inspections were made, together covering the village, city and the entire length of the creek. The reports of the inspecting engineer, with the analysis of samples of the creek water show the creek to be a fair potable supply above Kingston, and what little sewage it receives above that point can readily be kept out. They show also that both Kingston and Saugerties now contribute a certain amount of impurity which can only be obviated by systems of sewerage and drainage with outlets to other streams than Esopus creek, or complete purification of any discharge into that creek. The intention of the State Board, as expressed in a recent resolution, is to preserve the purity of streams that are or may be sources of potable supply, and to prevent as far as possible the pollution of any stream by sewage. In accordance with the former purpose, the city of Kingston was advised to limit to the minimum the amount of sewage discharged into the Esopus creek, and to purify it with modern methods of treatment before such discharge. Nearly all of the sewage of the city can be readily emptied into Rondout creek or the Hudson river, but the circumstances of location of outlets, and the fact that the Hudson river is a source of ice and potable supply below Kingston, demand a purification of the entire sewage of the city before discharge into any stream. Saugerties should also construct a system of sewers to prevent the entrance of their contents into the Esopus creek above the point where its water supply is taken, and a purification of this sewage will be necessary before discharge.

PLANS FOR SYSTEMS OF SEWERAGE AND SEWAGE DISPOSAL.

Several plans for the sewerage and sewage disposal of villages have come before the Board this year in accordance with acts of Legislature.

According to chapter 311 of the Laws of 1888, the plans for the sewerage and sewage disposal of New Rochelle were presented last year to the Board but those for sewage disposal not approved. Other plans were presented this year, but none sufficiently detailed or of a nature to warrant acceptance. The devising of a disposal system in this case that will prevent nuisance to neighboring islands and shores comply with chapter 414 of the Laws of 1885, have a minimum cost and still be certain to accomplish the necessary results, is a matter involving considerable expense and no small amount of ingenuity.

According to chapter 91 of the Laws of 1889, the city of Brooklyn submitted to the Board suitable plans which were accepted. The law provides that "No drain or sewer constructed under the provisions of this act shall discharge any solid matter, raw sewage or any other than liquid sewage into Jamaica bay, or the bays and creeks connecting with said Jamaica bay, and the method of collection and retention of solid matter and discharge of fluids must be approved by the State Board of Health before the construction of said sewers. Nothing in this act contained shall be construed to permit the laying of pipes in such manner as to in any way interfere with or contaminate the water supply of the twenty-sixth ward."

The village of White Plains presented plans for sewerage and sewage disposal, as required by chapter 312 of the Laws of 1888. In this case the Bronx river flows for a considerable portion of its course below the

village through a metropolitan district with a population rapidly increasing. In order to preserve existing sanitary conditions, and prohibit the discharge of polluted matter into the stream, a complete system for sewage purification was required so that the effluent should not give rise to complaint upon sanitary grounds. An additional reason for this is the use of a portion of the country through which the stream flows as a park for the city of New York. Objection has been raised to the discharge of this purified sewage into the river, on the ground that the stream was or could be used as a source of drinking water. The report of an inspector shows that there is practically no such use made of the water, and that there is at present an amount of pollution entering the stream from numerous sources along its banks, which in the aggregate renders the water undesirable. The increase of population along its banks will add to the contamination, but the construction of sewers and sewage disposal works will reduce the amount of offensive pollution.

Under chapter 375 of the Laws of 1889, providing a general method of procedure for obtaining sewerage for villages, a number of plans have been submitted, and many requests for advice and assistance made by sewer commissioners appointed under the act, and by village authorities.

Of the plans presented to the Board, that for Waterville, in June, was the first. The map showing the general system of sewers and the report of the village engineer are presented in the appendix, as well as the report of an engineer of the Board thereon. The plan is a modified separate system, providing for the admission of a certain amount of roof water to the sewers. It is proper to state in this connection that the question of sewage disposal

is one which the Board has prominently in view in discussing any system brought before it, and the approval of a system without some method of purification is qualified, as in this case, by the reservation that at some time there may be a need of purification of the sewage before ultimate discharge, when such purification will be insisted upon as a measure for the preservation of the public health and for the prevention of nuisances. This definite statement of the policy of the Board is the direct and legitimate outgrowth of its investigations and deliberations, and the necessity for it has been manifested in the discussion of various plans for sewerage and sewage disposal brought before it. It is unfortunate for Waterville that the proposal for sewerage was voted down at the election called for by the act.

The village of Tonawanda presented plans for sewerage upon the combined system, the peculiar circumstances of the case, as detailed in the report of the Board's engineer, demanding it. The question of disposal of the sewage is here left open for future developments. Being discharged into so rapid a stream as the Niagara river, it is quickly carried away, diluted and purified. This is true to such an extent that the effect of the sewage of the city of Buffalo upon the river is not noticeable at Tonawanda, though the village obtains its water supply from the river. The small additional amount of sewage from Tonawanda will not appreciably add to the pollution, but should the future develop any marked increase, the purification of the sewage, not only of Tonawanda, but of Buffalo and other places, should be insisted upon. This probable necessity is more remote in the case of Tonawanda than in that of Waterville. The position of the sewer outlet is above the intake of the water-works, but experiments show that the

currents, which are rather swift, carry the sewage between the mainland and the island on which the water-works are situated, the intake being on the opposite side of the island, so that it is a practical impossibility for the sewage to enter the water mains. The estimated amount of money necessary to construct the system has been voted by the people and the contract for a portion of the work has recently been awarded.

The village of Tarrytown presented the plans upon the separate system with some slight modifications to to meet peculiar conditions. The discharge here being into the Hudson river at salt water, at some distance from its main channel, it was necessary only to provide against the production of an effluvium nuisance from the deposit of the solid portions of the sewage in the shallow water near the shore, and on the shore itself, to be uncovered by every falling tide. This required simply a sedimentation of the solids, for which the plans provide sufficiently. The location of the disposal works, partly below high water, required contrivances for the automatic discharge of chemicals, as detailed in the plans.

Plans have been submitted by the village of Geneseo which, through misunderstanding, were lacking in some necessary particulars and have been returned to have this omission supplied. Other suggestions were made also by the Board's engineer, as indicated in his report.

Lansingburgh, Albion, Medina, Holley, Wellsville and Walton, have plans in progress upon which information and advice have been requested from this office, and which will probably be presented to the Board during the next year.

The experience of the past year has shown the necessity for a statement of what the Board requires

to be conveyed by the plans submitted, and of the most desirable form that these plans should take. The following suggestions are therefore made, and it is requested that those interested with the preparation of plans will follow them as closely as is practicable. Certain portions must be followed, while considerable latitude can be allowed upon others, as intimated.

1. A plan of the entire village will be required, showing all streets, and so far as practicable proposed streets. This must not be on a smaller scale than 250 feet to an inch and may be larger. A comprehensive title, stating what the map purports to show, must be placed thereon. The scale of the map must be distinctly stated, and an explanation of all symbols used must be given on it. Contour lines should be carefully located and drawn to interfere as little as possible with the delineation of other features. A sufficient number of elevations above an assumed datum, written in figures, should be given to show the governing elevations of the ground. The elevations of sewer invert at critical and other important points should be given, each surmounted by an oval as a distinguishing mark. When the plan presented does not propose to sewer the entire village, and the street profiles do not extend to the ends of the streets or to the village limits, the elevations of the ground at every change of slope in the streets beyond the limits of the profiles, and the elevations of the bottoms of the deepest cellars, or other localities below the level of the street, should be given in their proper locations upon the plan. Upon this plan must be shown all existing sewers, with all the information obtainable regarding their depth below the surface, grades, sizes, man-holes, lamp-holes, catch-basins, flush-tanks, etc.

The proposed system must be laid down in a clear and definite manner, showing the locations of the lines in the streets, the position of man-holes, catch-basins, lamp-holes, inspection-pipes, flush-tanks, ventilators or other appurtenances, by symbols readily distinguishable and explained in the map-legend. The sizes of pipe and the grades or inclination must be given in figures alongside the line, and points of change of inclination or of alignment must be definitely located, being part of the information given by the profiles, here repeated as a great convenience. Inclinations may be given as fall in feet per hundred or as a slope ratio. A sufficient number of arrows must be drawn alongside the lines to show clearly the direction of flow of sewage. The position of outlet must be clearly shown, and the direction of current in the body of water, if any, into which the sewage flows. Location of disposal works must also be shown. Independent lines of pipe proposed for subsoil or cellar drainage should be marked by a different symbol from that for tight sewer pipe lines, and the size of such pipes should also be given. When the territory covered by the village is large the details of sewers may be given on one or more sheets on the large scale, the entire village being shown on an accompanying map of a convenient smaller scale, which shall contain the general information required above.

2. Profiles of the streets proposed to be sewered and of other lines of sewer must be presented on separate sheets from the plan. These profiles should be extended to the entire length of the street and should be presented for every street in the village, unless the elevations beyond the ends of proposed sewer lines are placed on the plan as proposed in paragraph 1 above. These pro-

files should show the profile of ground surface, the elevation of particularly low points, such as cellar bottoms, low lots, etc., and their distances from the sewer line, and the grade line of the sewer. Location of man-holes, lamp-holes, catch-basins, flush-tanks, and other sewer appurtenances should be shown, also points of intersection with other streets and points of entrance of branches, with their elevations at entrance. Inclination of sewer should be given in figures, also points of change of inclination being clearly defined. A small title should appear on each sheet of profiles, giving at least name of village, scales and explanation of symbols.

3. Details of the general plans for constructions connected with the sewers, such as man-holes, catch-basins, lamp-holes, inspection pipes, junctions, valves, traps, should be given, and full drawings of any devices for special purposes demanded by the peculiar circumstances of the case. Sections of sewers other than circular should be shown. Full details of the outlet should be given, and plans, elevations, sections and details of special grounds, buildings, machinery or other apparatus used in connection with the disposal of the sewage and drainage. Definite scales for these details can not be prescribed. It is necessary that the scales used be large enough to present the information clearly and definitely, and plenty of room should be left between drawings, that they may not be unintelligible on account of crowding. It will be better to present the details on one or more sheets separate from the plans and profiles. Titles and subtitles enough to give name of village, explanation of symbols, names of objects delineated and scales should appear on each sheet of details.

4. General specifications for the construction of the system must accompany the plans, giving the general requirements and conditions regarding trenching, drain-

ing material, inspection and laying of pipe, character of materials and manner of construction of brick sewers and of man-holes, flush-tanks, outlets and other appurtenances. The specifications intended for contractors may be presented as fulfilling the above requirements, if considered desirable.

5. Duplicates of plans, profiles, details and specifications must be presented. The original will be returned to the sewer commissioners upon approval, with the official statement of that approval. The duplicate will be filed according to law, in the office of the State Board of Health. The originals may be in any color desired. As portions at least of each set of plans will be reproduced for the annual reports, it is quite necessary that the duplicates be drawn in black only, the distinction between lines being made by different forms of line rather than by colors. They must be as perfectly clear and definite as the originals, and may be upon tracing cloth. Red lines may be used if the ink is ground from a body color. Aniline red must not be used.

6. A report should be presented, written probably by the designing engineer, giving the date upon which calculations and locations were made, such as area, population, distribution, estimated increase in population, rainfall, amount of surface drainage to be taken care of and method of disposing of it, amount of roof-water, amount of sewage, and basis for the estimates of these amounts, a statement of such points as are peculiar to the locality, a description of devices for special purposes, and such other information as may be deemed necessary to a complete understanding of the plans as presented. This report should also give a general statement of the reasons for choice of system and of the method of disposal of sewage and drainage, an explanation of any

special features connected therewith, and a statement of the proposed manner of maintaining the works, where a purification plant is intended. A tabular statement of the amounts of water and sewage to be disposed of by each sewer branch and main will be found the shortest and most convenient manner of presenting the major part of the information above required.

DRAINAGE.

Two problems concerning the condition of abandoned canals have come before the Board this year. The first was concerning the condition of a portion of the abandoned Genesee canal, still in use as a feeder of the Erie canal. A sum of money was appropriated by chapter 470 of the Laws of 1889 to improve the condition of the feeder, the expenditure to be made upon a plan recommended by the State Board of Health. A careful examination of the locality by an engineer of the Board demonstrated the impossibility of properly treating the problem with the small amount of money available. A method of treatment was recommended which could but partially remove the present nuisances due to uneven bottom, small amount of water compared with the canal prism, and large amount of vegetation growing therein, the decay of which produced much offensive effluvium. Owing to the confessedly inadequate treatment possible under this recommendation with the small amount of money appropriated, nothing has yet been done in the case.

Under chapter 467 of the Laws of 1889 the plans for the drainage of portions of the abandoned Chemung canal at Millport and Lower Pine Valley were presented to the Board for approval. Here too the amount of money available was too small to treat the problem thoroughly. The plans were therefore approved, with

some recommended changes, so far as the money would carry them out.

One mill pond in process of drainage has been referred to the Board as a possible source of nuisance and ill health, viz., Kirby pond at Mt. Kisco. Recommendations for the treatment of the pond were made with the belief that proper ditching and tile draining with suitable treatment of the dead vegetation uncovered by drawing off the water would prevent any ill effects. The visit to the pond was made in January, and no further complaint has been heard therefrom. A casual inspection of the pond in December, and some inquiry, elicited the information that during this year, which has been quite wet, there had been no particular complaint to make of the bed of the pond though the treatment recommended had not been followed in anything like a thorough manner.

ABATEMENT OF NUISANCES.

The abatement of minor nuisances is a matter which seldom comes before the Board for specific action, owing to the full powers which local boards possess in this regard and to the thorough use of these powers by them. Occasionally, however, such matters come to the office on account of lack of concert of action between officers of different corporations or of seeming delay in action by local boards, which cause direct appeal to the State Board by interested parties. Such cases are usually amicably settled by calling the attention of the local board of health to the matter and requesting a report of their action. In but two cases this year has it been deemed advisable to send an inspector to make definite and detailed recommendations. One of these was that of a

slaughter-house in the town of Fleming, adjoining the city of Auburn, which was found to require considerable renovation to reduce it permanently to a sanitary condition. The other was the hotel in the village of Norwich, already referred to in discussing the subject of sewerage for that village.

ADULTERATION OF FOOD AND DRUGS.

During the past year the analysts of the Board have been actively engaged in the collection and analysis of samples. Drugs and medicinal preparations have chiefly received attention, being the most important, they being in such constant use and liable to dangerous adulteration. Food articles have been examined as exigencies arose. During the past four years a systematic inspection of the drug supply of the State has been carried on, and the method pursued has been so perfected and the results obtained so valuable that it has been deemed advisable not to interrupt the continuity of the work. The reports of the analysts, appended in their proper places, show that during the past year 807 samples of the more important drugs, pharmaceutical preparations, alkaloids and medicinal chemicals, have been collected from retail drug-stores throughout the State and subjected to analysis, the total number so examined since work was begun on the present plan in September, 1885 being 2,588. Dealers whose samples have proved of inferior quality have been promptly notified and warned to desist from the sale of such articles, and this year, for the first time, the name and place of business of each dealer from whom samples have been purchased is published in full. No legal proceedings for violation of the law have been commenced (though such a course may be deemed necessary ere long), for the reason that the

majority of pharmacists are believed to be innocent of any intention willfully to violate the requirements of law by the sale of impure or adulterated drugs, and it has been hoped that a thorough inspection and prompt notification in case of improper sales would eventually lead to their discontinuance. In other words it has been assumed that the sale of drugs of inferior quality, at retail at least, was oftener due to ignorance than to design, but should it appear that such is not the case and that after due information and warning certain dealers persist in the sale of adulterated or inferior articles the most flagrant cases will be selected for prosecution. The work already done has been productive of much good, and it has been on all sides most heartily commended. During the coming year it is proposed to continue it on much the same plan as at present, though on a more extensive scale. It is gratifying to add that the larger manufacturers of drugs and chemicals, both in and out of the State, have heartily approved of this part of the Board's work, and have aided whenever it has been in their power to trace improper drugs sold under their labels.

Recommendations.

No amendments of law are needed, the laws as they are being considered sufficient. Many well-meaning persons have advocated various changes, but these it is believed would not be proposed upon a fuller study of the subject. The framing of sanitary measures is a work of comparative ease; the making the people acquainted with their provisions and getting them accustomed to obey them is attended with much difficulty. This latter task has been the one to which the State Board has addressed itself with unflagging pur-

pose, and at length, after years of effort, it sees abundant justification for its course. Starting with the law of 1880, its features were enlarged in 1881 and again in 1882. Additions were further made in 1885, and the ambiguous language of the statute made more definite by an entirely new draft of the act that year, which, with slight additions in 1888, has been the basis of sanitary legislation to the present.

While the essential features of the law familiar to the people have been preserved, and no obstacle thus interposed to the education of the people, wise and consistent additions have been engrafted as the experience of the Board in its workings has suggested. The State Board has, therefore, been progressive, and in no sense has its action savored of stagnation. It is constantly feeling the sanitary pulse of the State through the 1,400 local organizations over which it exercises supervision, and is convinced that the nearer public health work is brought to the people through local organizations, with a competent educational central bureau, the more valuable the sanitary results.

Propositions have been submitted for the creation of intermediaries between the State and local boards in the shape of county health service; but this has met with no favor as being foreign to the genius of the government of the State in towns, villages and cities, and in no sense a sanitary gain. There should be no barrier interposed, and, although direct communication with these various health organizations increases the work of the State Board of Health, yet this is precisely what it has been created for, and the information it has to impart and the counsel it is prepared to offer should reach directly the

local organization needing it without being filtered and possibly attenuated by passing through a county medium.

Respectfully submitted.

THOMAS NEWBOLD,
President.

WILLIAM E. MILBANK, M. D.,
THOMAS S. DAWES, M. D.,
FLORENCE O. DONOHUE, M. D.,
MAURICE PERKINS, M. D.,
JOSEPH D. BRYANT, M. D.,
WILLIAM M. SMITH, M. D.,
Health Officer of Port.

CHARLES F. TABOR,
Attorney-General.

LEWIS BALCH, M. D.,
Secretary and Executive Officer.

APPENDIX.

Tenth Annual Report

of the

State Board of Health.

REPORT OF THE EXECUTIVE AND FINANCE COMMITTEE.

1888.		Traveling and Necessary Expenses of Members.	
Oct.	10.	Maurice Perkins, expenses on official duty....	$48 75
	13.	Lewis Balch, expenses on official duty.......	26 68
	13.	Alfred Mercer, expenses on official duty......	30 21
	23.	Lewis Balch, expenses on official duty.......	57 15
Nov.	10.	Lewis Balch, expenses on official duty.......	31 45
	19.	Frederick Carman, expenses on official duty..	1 50
Dec.	1.	Lewis Balch, expenses on official duty	163 95
	1.	Maurice Perkins, expenses on official duty....	85 55
	12.	Frederick Carman, expenses on official duty..	3 50
	18.	Alfred Mercer, expenses on official duty......	54 94
1889.			
Jan.	7.	Frederick Carman, expenses on official duty..	15 73
	8.	Lewis Balch, expenses on official duty	60 55
Feb.	5.	Thomas S. Dawes, expenses on official duty ..	15 00
	21.	Lewis Balch, expenses on official duty	37 50
	21.	Frederick Carman, expenses on official duty..	13 35
Mar.	10.	Lewis Balch, expenses on official duty........	30 20
April	1.	Lewis Balch, expenses on official duty	30 70
	16.	Lewis Balch, expenses on official duty	11 04
May	10.	Lewis Balch, expenses on official duty	42 55
	10.	Frederick Carman, expenses on official duty ..	14 65
June	5.	Lewis Balch, expenses on official duty	20 10
	15.	Alfred Mercer, expenses on official duty......	34 06
	24.	Frederick Carman, expenses on official duty ..	16 16
	28.	Frederick Carman, expenses on official duty ..	15 50
	28.	W. E. Milbank, expenses on official duty	36 40
July	5.	Frederick Carman, expenses on official duty..	13 20
	5.	Lewis Balch, expenses on official duty	58 90
	10.	W. E. Milbank, expenses on official duty	13 45
	16.	Frederick Carman, expenses on official duty..	4 61
	19.	Maurice Perkins, expenses on official duty ...	37 82
	19.	Frederick Carman, expenses on official duty ..	3 00
	29.	Frederick Carman, expenses on official duty ..	50 44

1889.			
Aug.	2.	Lewis Balch, expenses on official duty	$39 87
	6.	Thomas S. Dawes, expenses on official duty...	35 00
	14.	Frederick Carman, expenses on official duty..	12 00
	19.	Frederick Carman, expenses on official duty..	17 00
	31.	Lewis Balch, expenses on official duty	41 15
	31.	Frederick Carman, expenses on official duty..	12 75
Sept.	13.	Frederick Carman, expenses on official duty..	26 06
	13.	Lewis Balch, expenses on official duty	12 46
	23.	Frederick Carman, expenses on official duty ..	22 10
			$1,296 98

1888.		SPECIAL EXPERT AND TEMPORARY SERVICE.	
Oct.	4.	Charles C. Brown, engineering.............	$203 36
	4.	Arthur Hollick, inspecting Newtown creek ...	54 50
	8.	M. L. Edwards, indexing, etc...............	40 08
	10.	Grace B. Winne, indexing, etc.	54 00
Nov.	7.	Arthur Hollick, inspecting..................	69 65
	7.	John D. Davis, expenses on Indian Reservation	137 09
	9.	Charles C. Brown, engineering....	206 91
	10.	Grace B. Winne, indexing	54 48
	12.	F. C. Beals, expenses on Indian Reservation ..	130 00
Dec.	1.	Emil Kuichling, engineering................	78 66
	4.	J. D. Davis, expenses on Indian Reservation..	100 00
	5.	A. Hollick, inspecting......................	58 75
	6.	F. C. Curtis, inspecting small-pox	7 50
	8.	Charles C. Brown, engineering..............	197 71
	14.	Grace B. Winne, indexing	59 32
	18.	J. D. Davis, expenses on Indian Reservation..	50 00
1889.			
Jan.	2.	Emil Kuichling, engineering................	103 80
	8.	Arthur Hollick, inspecting..................	36 25
	8.	F. C. Curtis, medical inspections	26 57
	14.	Grace B. Winne, indexing	55 20
	14.	Charles C. Brown, engineering..............	263 69
	30.	F. P. Burt, preparing plates showing nuisances on Croton watershed..............	518 10
	30.	Charles Hart, lithographing maps of Croton watershed	114 00
Feb.	5.	Emil Kuichling, engineering................	191 10
	5.	Arthur Hollick, inspecting..................	35 05

1889.			
Feb.	14.	Grace B. Winne, indexing	$61 80
	16.	Charles Hart, lithographing maps of Croton watershed	36 75
	16.	Charles C. Brown, engineering	197 24
	16.	Richard T. Gorman, testing Capitol drains	10 00
	16.	George Backman, testing Capitol drains	10 00
	16.	Edward Brennan, testing Capitol drains	10 00
	20.	Chas. S. Collins, services during small-pox at shaft 3, aqueduct	100 00
	20.	F. C. Curtis, inspecting small-pox at Fort Plain	12 36
	20.	M. L. Edwards, indexing, etc	141 42
	28.	Charles Hart, diagrams of Croton watershed	22 00
	28.	F. P. Burt, preparing lithographs Croton watershed	7 00
March	4.	A. Hollick, inspecting	34 75
	10.	Chas. C. Brown, engineering	120 24
	14.	Grace B. Winne, tabulating	56 40
	25.	M. L. Edwards, indexing, etc	76 48
April	2.	Arthur Hollick, inspecting	45 90
	15.	Grace B. Winne, tabulating	63 60
	18.	Charles C. Brown, engineering	89 46
	22.	M. L. Edwards, indexing	24 00
May	11.	Arthur Hollick, inspecting	35 75
	14.	Grace B. Winne, indexing	60 00
	23.	M. L. Edwards, indexing	48 00
June	3.	Emil Kuichling, engineering	85 33
	6.	Arthur Hollick, inspecting	23 85
	12.	Thomas S. Jones, Jr., office boy assistance	3 50
	12.	Chas. C. Brown, engineering	51 47
	18.	Grace B. Winne, indexing, etc	50 40
	24.	M. L. Edwards, indexing, etc	52 80
July	1.	Arthur Hollick, inspecting	35 70
	16.	Grace B. Winne, indexing	50 08
	16.	Thomas S. Jones, Jr., office boy assistance	4 00
	23.	M. L. Edwards, indexing, etc	68 07
Aug.	6.	Chas. C. Brown, engineering	211 88
	7.	Arthur Hollick, inspecting	37 10
	15.	Grace B. Winne, indexing	45 92
	23.	M. L. Edwards, registering	108 90
	31.	F. C. Curtis, medical inspection, Lake George,	35 16

1889.			
Sept.	5.	M. L. Edwards, registering, etc	$37 02
	6.	Arthur Hollick, inspecting	47 05
	13.	Chas. C. Brown, engineering	408 71
	13.	Thomas S. Jones, Jr., office boy assistance	10 00
	13.	Robert White, hire of steam launch	190 00
	26.	M. L. Edwards, registering, etc	122 94
	26.	Grace B. Winne, indexing	72 00
			$5,860 80

SALARIES AND WAGES.

1888.			
Oct.	31.	Salaries for month	$1,150 00
Nov.	30.	Salaries for month	1,150 00
Dec.	31.	Salaries for month	1,150 00
1889.			
Jan.	31.	Salaries for month	1,150 00
Feb.	28.	Salaries for month	1,150 00
Mar.	31.	Salaries for month	1,150 00
Apr.	30.	Salaries for month	1,150 00
May	31.	Salaries for month	1,150 00
June	30.	Salaries for month	1,150 00
July	31.	Salaries for month	1,150 00
Aug.	31.	Salaries for month	1,150 00
Sept.	30.	Salaries for month	1,150 00
			$13,800 00

PRINTING AND STATIONERY.

1888.			
Oct.	4.	Fergus Halpen, printing envelopes, etc	$12 50
	5.	Messrs. C. Van Benthuysen & Co., printing, etc.	131 30
Dec.	18.	Argus Company, printing extract on School Hygiene	182 00
	18.	Fergus Halpen, printing postals and circulars	49 00
	18.	R. K. Quayle, steel plate printing	16 67
1889.			
Mar.	5.	Weed, Parsons & Co., printing small-pox circulars	13 96
Apr.	1.	A. B. Dick & Co., stationery	1 80
May	3.	Van Benthuysen & Co., printing bulletin, etc.	318 00
	11.	R. K. Quayle, printing three reams note headings, steel plate	23 60

1889.			
June	15.	Fergus Halpen, printing wrappers and envelopes	$55 75
	28.	Van Benthuysen & Co., registers and printing Bulletin	533 01
July	16.	R. K. Quayle, steel plate headings	29 16
	19.	James B. Lyon, edition of New York Potable Water Supply, with cuts, etc.	362 31
Sept.	13.	Van Benthuysen & Co., printing bulletin, etc.	98 00
	25.	Fergus Halpen, printing postals	7 50
	27.	Argus Company, printing	71 97
	27.	James B. Lyon, printing extract from report	242 57
			$2,149 10

TELEGRAPHY AND TELEPHONE.

1888.			
Oct.	5.	Hudson River Telephone Company, September	$5 00
	5.	Western Union Telegraph, September	8 17
Nov.	7.	Hudson River Telephone Company, October	6 95
	7.	Western Union Telegraph, October	15 53
Dec.	4.	Hudson River Telephone Company, November	6 50
	4.	Western Union Telegraph Company, November	7 36
1889.			
Jan.	3.	Hudson River Telephone Company, December	7 25
	3.	Western Union Telegraph Company, December	9 35
Feb.	5.	Hudson River Telephone Company, January	6 70
	5.	Western Union Telegraph Company, January	5 68
Mar.	5.	Hudson River Telephone Company, February	7 10
	5.	Western Union Telegraph Company, February	6 49
Apr.	4.	Hudson River Telephone Company, March	6 95
	4.	Western Union Telegraph Company, March	8 51
May	3.	Hudson River Telephone Company, April	5 80
	3.	Western Union Telegraph Company, April	3 22
June	6.	Hudson River Telephone Company, May	5 40
	6.	Western Union Telegraph Company, May	1 31
July	5.	Hudson River Telephone Company, June	5 20
	5.	Western Union Telegraph Company, June	6 90
Aug.	6.	Hudson River Telephone Company, July	5 95
	6.	Western Union Telegraph Company, July	3 12
Sept.	6.	Hudson River Telephone Company, August	6 50
	6.	Western Union Telegraph Company, August	6 83
			$157 77

LIBRARY, MAPS AND CHARTS.

1889.			
Jan.	3.	The Sanitarian, subscription for 1889	$4 00
Feb.	11.	Westerman & Co., books	11 00
	13.	B. Quinn, subscription Railway Guide	5 00
Mar.	7.	B. Westerman & Co., books	44 75
	7.	The Sanitary Engineer, subscription	4 00
Apr.	4.	John S. Dunbar, Medical Register	3 00
May	16.	Journal Comparative Medicine, subscription	2 00
June	12.	Sampson, Murdock & Co., Albany Directory	3 00
	15.	The Engineering News	5 00
			$81 75

FURNITURE.

1889.			
Feb.	2.	R. R. Watson & Co., letter boxes	$11 50
July	5.	W. W. Walsh, mail bag	7 50
Aug.	12.	E. S. Campbell, tin cases for maps	4 00
			$23 00

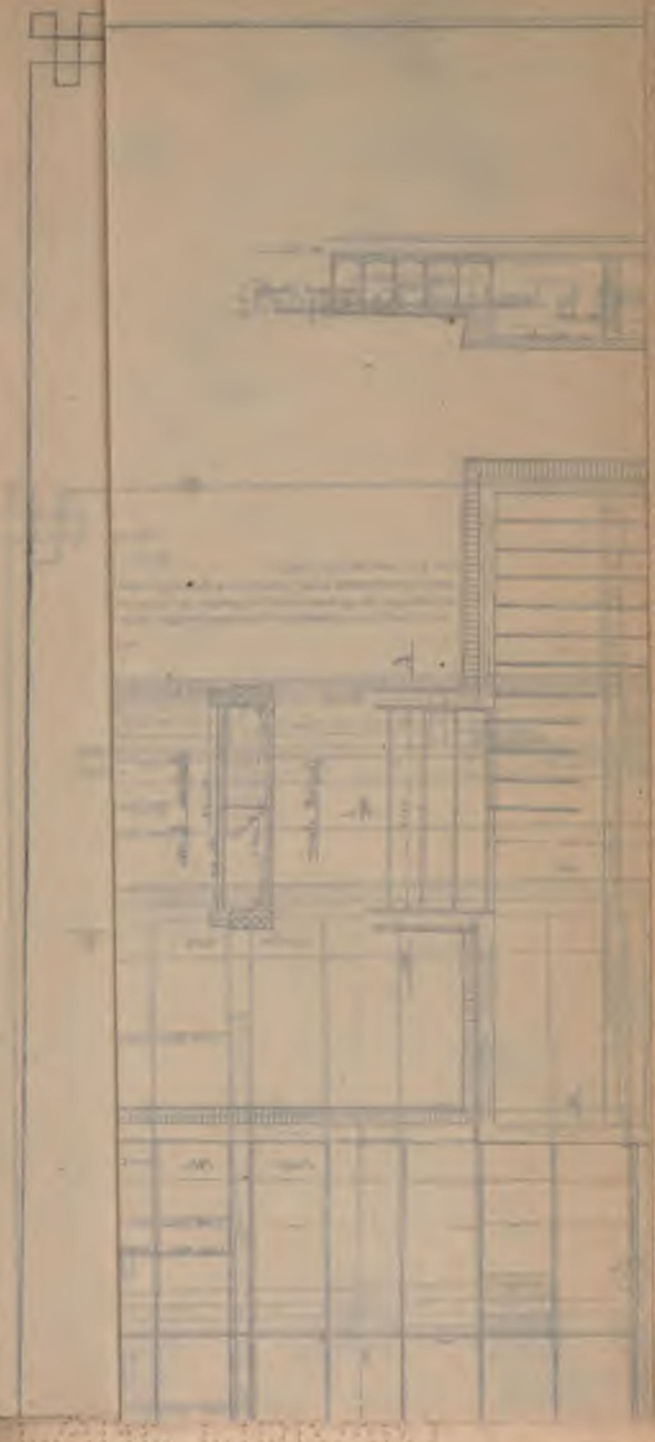
PETTY CASH.

1888.			
Oct.	5.	T. F. Romeyn, boxes	$16 25
	13.	S. G. Speir, typewriter supplies	8 00
	13.	Cyrus Edson, vaccine for Indian Reservation	39 00
	23.	Cyrus Edson, vaccine for Indian Reservation	26 00
Nov.	7.	Albany News Company, diary	1 50
	7.	Irving A. Watson, American Public Health Association	6 00
Dec.	4.	Cyrus Edson, vaccine for Indian Reservation	3 00
	31.	Rodgers & Ruso, typewriter supplies	1 20
1889.			
Jan.	8.	Stone & Shanks, map-holder	2 50
	30.	McClure & Co., medicine for Indian Reservation	7 35
Feb.	2.	McClure & Co., oil of peppermint	5 50
	20.	S. G. Speir, typewriter supplies	75
Apr.	2.	S. G. Speir, typewriter supplies and mending typewriter	12 75
June	12.	S. G. Speir, typewriter supplies	80
July	5.	Coach hire	3 50
	19.	McClure & Co., oil of peppermint	16 86
			$160 96

PLANS FOR SYSTEMS

OF

SEWERAGE AND SEWAGE DISPOSAL.



PLANS

FOR

Sewage Disposal of the Twenty-sixth Ward of the City of Brooklyn.

The accompanying plans for the sewage disposal of the Twenty-sixth ward of the city of Brooklyn were submitted to the State Board of Health and duly approved.

PLANS

FOR

Sewerage and Sewage Disposal of the Village of White Plains.

The accompanying plans for the sewerage and sewage disposal of White Plains were submitted to the State Board of Health and duly approved.

SPECIFICATIONS FOR MATERIAL AND LABOR TO BE USED IN THE CONSTRUCTION OF SEWERS IN THE VILLAGE OF WHITE PLAINS, WESTCHESTER COUNTY, N. Y.

General.

Price bid for sewer.

1. The price bid for furnishing and laying of sewer, shall include the cost of furnishing all straight pipe and specials, the cost of all oakum or jute, cement, Y covers and all labor necessary in properly laying and jointing or cementing all such pipe and specials. Said price must also include the costs of all excavations, back filling, restoration of streets, etc.

Price for man-holes, etc.

2. The price bid for each man-hole, catch-basin or outlet-chamber will be a lump sum, which must include the cost of all additional excavations, together with that of furnishing and putting in place all necessary materials, such as concrete foundations, masonry, invert, junctions, step-irons, flagstone, coping, cast-iron covers, etc., complete.

Price per lamp-hole.

3. The price bid for each lamp-hole will be a lump sum, and shall include the cost of furnishing and putting in place all required sewer pipe, the cast-iron box and cover; also all the brick or concrete needed in the foundation of the ring and cover.

Specials and covers.

4. The price bid on each flush-tank must include furnishing all brick and iron work, the pipe, specials and covers used for overflow and lamp-hole, and the apparatus for discharging the same. The contractor shall furnish a six-inch Rhodes-Williams tank. The contractor must in addition furnish and set the following, as shown in drawings: One piece three-quarter inch iron pipe eighteen inches long, with brass ferrule, two elbows; one piece three-quarter inch iron pipe, twenty-four inches long, one shut-off cock, three-quarter inch lever handle, female screws; one one-eighth inch air or pet cock, with three-quarter inch male screws; one three-quarter inch lever handle straightway cock with one male screw, and two iron staples six inches long, and connect the service pipe with the water main; all the cocks to be brass.

5. The price bid for masonry includes the total cost of masonry, whether in water or in dry ground.

6. The price bid per foot of iron pipe (100 lbs. pressure) must include the extra work due to its position, such as passing under railroads, basins or creeks, or whether used as an outlet, with the lead and oakum necessary.

7. The length of the sewer laid will be measured on the center line of the pipe, and to and from the centers of all man-holes, flush-tanks, outlet-chambers, catch-basins or junctions.

Sewer-pipe.

8. All pipe used shall be of the best quality vitrified, salt glazed sewer pipe, the straight pipe to be in lengths not less than three feet long. All "Y" and other specials shall not be less than two feet in length and of the same quality and manufacture as the plain pipe. No pipe shall be used that varies from a straight line more than one-fourth of an inch per foot in length, or of which the difference in any two diameters of the same pipe is more than one twenty-fourth of the regular diameter. This applies to bell as well as spigot end. No pipe shall be used that does not ring perfectly clear. No pipe shall be used that has a piece broken from the spigot end deeper than one and one-half inch or longer, measured in the middle of the fracture, than one-fourth the diameter of the pipe. Should the broken piece be at the bell end, the pipe must be rejected if the fracture extends into

the body of the pipe, or if its length, measured as above, is greater than one-sixth the diameter of the pipe.

All pipes must be smooth on the inside and free from broken blisters or lumps that would catch fibrous matters. Broken blisters or flakes on a pipe or special which are thicker than one-sixth of the normal thickness of said pipe or special, and whose largest diameters are greater than one-eighth of the inner diameter of said pipe or special shall cause rejection.

Furthermore, if said broken blisters or flakes are larger or smaller than just defined, then, unless said pipe or special can be properly fitted and laid so as to bring such broken blister or flake on the top or upper side of the sewer, the said pipe or special shall be rejected. No pipe that has fire or other cracks extending clear through shall be used.

All hubs or sockets must be of sufficient diameter to receive to their full length the spigot end of the next following pipe or special without any chipping whatever of either, and also to leave a space of not less than one-eighth of an inch in width all around for the cement mortar joint. Pipes and specials which can not be thus fitted into each other shall be rejected.

All pipes shall be of standard thickness.

The depth of the hub of any pipe shall be at least one inch greater than the thickness of the said pipe.

Subsoil drains.

9. Subsoil drains of second class vitrified sewer pipe shall be laid with cement alongside of the sewer in such streets as are designated by the engineer, and at a price stated in the proposal.

Care shall be taken to place such material taken from the trench, as the engineer shall direct, about and above the tile drains.

House sewers.

10. House sewer pipes, four inches in diameter, shall be laid from each "Y" branch in the street sewer to the curb line on such streets as the board shall direct, and at a price stated in the proposal.

Cement.

11. All cement must be of the best quality of "Rosendale," or other brand of equally good quality, and have a tensile strength, after twenty-four hours, of eighty pounds per square inch. Port-

land cement shall be of first quality, and show a tensile strength of not less than 100 pounds per square inch in twenty-four hours.

The contractor must furnish samples for testing from each barrel, should the engineer or inspector so direct.

Mortar.

12. Mortar for brick work shall consist of one part of cement and two parts of sharp, clean sand, mixed dry. Only pure cement shall be used in jointing pipes.

No mortar is to be used after it has begun to set.

Concrete.

13. Concrete shall consist of one part of cement, two of sand and three of broken stone. The materials must be mixed dry before using. When it becomes necessary to make concrete by grouting, no sand shall be used, but the grout made of pure cement.

Brick.

14. All bricks shall be hard burned, so as to give a clear ring when struck together and to be in true form. No half or broken bricks shall be used.

Iron pipes and castings.

15. All iron pipes must be without flaw or defect, save that minor defects which may be laid at the top, and which do not affect the strength or tightness of the pipe for the purposé for which it is intended, may be allowed. Other iron castings must be true in form, of full weight and free from all defects which can, in any way, lessen their usefulness or durability.

Sand.

16. To be sharp, clean and not of excessive coarseness.

Oakum.

17. May consist of flax, jute, manilla or hemp. Must be twisted in the form of a loose rope.

Cut stone.

18. Cut stone for catch-basin covers must be solid stone slabs cut in accordance with drawings.

"Y" covers.

19. "Y" covers must be of zinc or galvanized iron about one-twentieth of an inch thick, and cut to fit the bell of the "Y" loosely.

Excavation of ditch.

20. The ditch shall be excavated along the line designated by the engineer, and according to the depths given by him. The contractor shall notify said engineer when he desires a new street laid out and shall furnish him all the manual assistance he desires for this purpose, as well as all stakes or spikes that may be required. The engineer shall limit the amount of street to be opened in advance of the work. Should the ditch be excavated below the required depth, the contractor shall fill the same to grade with material, at his own expense, and tamp it thoroughly before laying down the pipe. The engineer may order any ditch braced, sheeted or floored that he may deem necessary; nor shall the contractor receive any extra pay for lumber used, unless the same be left in the ditch by order of the engineer. The width of the ditch on the bottom must be at least one foot greater than the outer diameter of the pipe.

Classes of material excavated.

21. All material excavated will be classed under one general head—earth, and no modification or change in classification will be made.

Rock excavation.

22. When rock is to be excavated, it shall be taken out twenty feet in advance of the laying of the pipe or sewers, and six inches below the grade of the outer bottom of the pipe or sewers, and the trench then filled up to the level of that grade with clean, sharp sand or clean gravel, and thoroughly rammed and made solid.

Bridge crossings.

23. At such street crossings and other intermediate points as may be directed by the trustees, or the engineer, the trenches shall be bridged in a proper and secure manner, so as to prevent any serious interruption of travel upon the roadway and sidewalks of such street, and also to afford necessary access to particular public or private premises. The material used, and the mode of constructing such bridges and the approaches thereto, must be satisfactory to said board and engineer, and the cost of all such work must be included in the regular price bid for the sewer.

Pipes to be laid on full beds.

24. Before each pipe is put in place, the bottom must be excavated under its end to receive the socket, so that the whole length of the pipe will lie firmly on the graded bottom of the trench. After the joint has been cemented, this excavation must be carefully filled with sand or dry earth to support the cement firmly in its place.

Pipe-laying.

25. No pipe shall be laid except in the presence of the engineer or his authorized inspector. The contractor shall notify the engineer whenever he is ready to lay pipe in any particular ditch. The engineer shall have the power to order the removal and relaying of any pipe laid against his orders or during his absence from the work. The engineer shall use such means as he deems proper for having the pipe laid properly to grade, and the contractor shall provide him all manual labor, stakes or twine necessary for that purpose.

The pipes and specials shall be so laid in the trench that after the sewer is completed the interior surface thereof shall conform on the bottom accurately to the grades and alignments fixed and given by the engineer. The main sewer will be divided by man-holes and lamp-holes into a number of divisions or working sections, in each of which the grades and alignments shall, under ordinary circumstances be truly straight. Changes of grade or direction, or both, in said sewer will generally be made at man-holes or lamp-holes.

The joints between the pipes shall be caulked with jute or oakum to prevent the entrance of the cement into the interior of the pipes, and made perfectly water-tight by completely filling out the entire annular space between the exterior of the spigot end and the interior of the hub with cement.

In dry ditches, Rosendale cement shall be used in jointing the pipes, but Portland cement shall be used in the wet ditches, should the engineer so desire. To insure water-tight joints, the engineer may direct that the following method of jointing the pipe be used.

Each length or strand of the jute shall be of a diameter to loosely fill the width of joint, and shall be thoroughly soaked in a Portland cement mortar, made of a thick paste of clear cement and water, and shall be of a length to go once around the circum-

ference of the pipe and lap over two or three inches. This shall be driven home with caulking tools, and shall be succeeded by a sufficient number of strands to fill the joint room to within one-half inch of the outside of the bell, breaking joints with the laps, all driven home and throughly joined together. The joint shall then be finished by filling the remaining one-half inch of joint room with a clear Portland cement, the joint room, when finished, being completely filled all around the pipe to the outside lines of the bells.

The contractor will furnish the pipe-layer with a bag, stuffed with shavings or hay, of a size sufficient to fit the pipe, rather tightly, with a rope about ten yards in length fastened at one end to the mouth of the bag.

The bag must be placed in the first pipe, the rope passing through each pipe as it is laid down. After the joints are made the bag is then to be drawn forward, at such times before the cement has set as to smooth off and produce a true surface at each cement joint and a continuous thin coating of cement on the lower half of the pipe. The joint being finished, great care must be taken not to disturb the pipes by stepping on or near them, by throwing earth upon them from the bank, or otherwise.

Iron pipe shall be laid with lead joints and be tight under the pressure at which they will be used.

Brick sewers.

26. Brick sewers are to be built, as shown on drawings, of bricks well bonded with broken joints, flushed full on ends, sides and bottom with mortar. The bricks are to be laid on radial lines with joints not more than one-fourth of an inch thick.

The contractor shall furnish all centers and templates for forming the sewers to the sizes and shapes required.

No centers shall be struck until the work is thoroughly set, and then only on the written order of the engineer. The centers must be struck with great care so as not to crack or injure the sewer. After the centers are drawn, the joints must be struck with neat Portland cement and the entire inside of the sewer coated with a thin wash of pure Portland cement applied with a brush.

All fresh work must be carefully protected from injury. No wheeling or walking on it must be allowed, and any portion injured must be relaid by the contractor without extra charge.

"Y" branches.

27. The contractor shall place "Y" branches in pipe sewers and slants in brick sewers wherever the engineer may direct. They shall be closed with a sheet iron cover plastered with an inch of mortar. The contractor shall allow no person to make connections with the "Y" in the street sewer except under written orders from the board of trustees. But should the line of pipe cross any private drain in such a way as to injure the same, the engineer shall have the right to direct the connection of said drain with the sewer.

"Y" branches will be four inches in diameter, and will average one for every sixteen feet of sewer.

When removing the caps from the branches to join branch lines with the sewer, great care will be taken to prevent the entrance of earth, mortar, etc., into the sewers.

Closing pipe at night.

28. When the branch is left for the night, or the pipe laying is stopped by storms, care will be taken that the end of the line of pipe is closed water-tight with a wooden plug and cement, or with bricks laid in lime mortar.

Back filling.

29. In back filling, great care should be taken not to disturb the pipes by throwing earth upon them from the top of the ditch, or by walking upon or by the side of them before a covering of at least two feet has been made. The earth shall be carefully tamped around and about the pipe by such means as the engineer shall direct, and to a depth of two feet before using heavy tamps. After a small portion of the pipe has been covered to the depth of two feet, a man will stand on the filling and will continue this depth along the whole line by carefully placing over the pipes ahead of him such fine dry earth as shall be shoveled to him by men above. In completing the filling above two feet, the same will be rammed in layers of about one foot and rammed with twenty-five pound rammers. In crossing streets, gutters, sidewalks and other places over which there is a great amount of travel, however, more attention will be given to making the filling compact than in unfrequented localities; and where the engineer requires it, a portion of the streets will be planked. In filling, the number of men ramming shall not be less than one-third the

number of men shoveling, or the trench may be flooded with water with the permission of the engineer.

Restoration of streets.

30. The contractor shall restore the surface of the streets to as good condition as they were before being entered upon by him. The refilled earth must not be heaped more than six inches above the original surface, and the line of the ditch must be passable to traffic within three days after the pipe is laid. The contractor shall use all pains to preserve the original excavated surface when the latter is a better material for road surface than the subsoil. All the work of restoring surface of streets and replacing pavements, crosswalks or curbs shall be done to the satisfaction of the street committee of the board.

All streets must be cleaned up and placed in a neat and orderly condition before the work contained in that portion is included in any monthly estimate. All surplus earth and material must be cleared away, and any deficiency of material supplied by the contractor at his own cost that may become necessary to restore the street to its proper condition.

Removal of rubbish by the board.

31. Should the contractor leave any unnecessary rubbish, earth or material on the street during the progress of the work, the engineer shall notify him to remove the same. Should the contractor fail to do so within three days, the board may cause the same to be removed and the expense thereof shall be deducted from any moneys due or to become due to the contractor.

Man-holes.

32. Man-holes shall be constructed of eight-inch brick work laid in cement mortar. They shall be plastered on the outside and washed with a coat of clear cement on the inside. They must be four feet inside diameter at the bottom, and two feet four inches at the top. Cast iron steps of the form shown on the plans shall be placed at intervals of fifteen inches. The man-holes shall be covered with an iron ring and cover, of the form shown on the drawings, weighing not less than 325 pounds. All sewer channels in man-holes, unless otherwise ordered, shall be of split sewer pipe backed with concrete.

Pipe or brick branches, as the case may be, shall be put in all man-holes where directed, and their outer ends securely closed.

Lamp-holes.

33. Lamp-holes shall be constructed by carrying up straight pipes from a "T" in the sewer to within six inches of the surface. An iron ring and cover weighing not less than 250 pounds shall be placed upon the brick foundation. All lamp-holes shall be constructed of the same size pipe as the sewer on which they are located.

Flush tanks.

34. Flush tanks shall be five (5) feet in diameter at the bottom, with the sides carried up straight for a distance of four feet above the flow-line of the pipe. They shall be of eight-inch brick work, plastered inside and out, and must be covered with tight iron cover of the form specified for man-holes. The emptying apparatus must be set according to the direction of the engineer.

Catch-basins.

35. Catch-basins will be built as shown on drawings of eight-inch brick-work, with stone cover properly cut and set.

Inlets.

36. Stone water inlets will be as shown on drawings, of ten-inch sewer-pipe, with cast-iron ring and grating not to weigh over 200 pounds. The price bid on catch-basins and inlets will include the furnishing and laying of the necessary ten-inch sewer-pipe to connect with the sewer, the length of which will be about thirty-three feet.

Precautions.

37. All excavations, embankments, rubbish heaps and other obstructions incident to the work must be protected with barricades and lights to prevent accidents to passengers on the streets, and especial precautions must be taken to secure the safety of buildings and property near the excavation. All the village ordinances relating to such precautions and safeguards must be faithfully observed by the contractor, he holding himself personally amenable for any disregard or violation of them by his employés or agents.

The contractor shall provide for all water courses and drains interrupted during the progress of the work, and replace them in as good condition as he found them.

The contractor shall not obstruct the gutters of any street or road, but shall provide for the free passage of surface water along same.

Water and gas-pipes.

38. In digging about the water service and gas-pipes, the contractor must exercise special care, and if injury is caused the cost of repairing must be paid by the contractor.

39. All the work contemplated by these specifications shall be done to the satisfaction of the engineer and board, and all materials and workmanship of whatever description, furnished and performed by the contractor, shall be subject to the inspection and rejection of said engineer and board and their duly authorized agents.

Whenever unfaithful or imperfect work is discovered, it shall be corrected and repaired immediately upon the requirement of said engineer, notwithstanding that it may have been passed over or overlooked by an inspector. The inspection of the work is not intended to relieve the contractor from any of his obligations to perform sound and reliable work as herein described.

Explanations and corrections.

40. The meaning and intent of these specifications, where any obscurity may appear, will be explained and defined by the engineer, who will likewise give all directions and determinations necessary for the due and full effect to any of the provisions of the said specifications.

Disorderly workmen.

41. The engineer shall have the right to order the discharge of any disorderly or incompetent person employed by the contractor, and such person shall not be reëmployed.

SPECIFICATIONS FOR A SEWAGE DISPOSAL PLANT, AT WHITE PLAINS, N. Y.

GENERAL CONDITIONS.

The amount of work to be covered by these specifications is approximately as follows:

The furnishing and erecting of a disposal plant, with all the necessary apparatus and machinery complete, with all details as shown on the various drawings or as set forth in the specifica-

tions; also such small details as are neither shown on the plans nor mentioned in the specifications but are necessary for the proper working of the various machines and apparatus.

Engineer.

All the work to be done under the direction and subject to the approval of the engineer in charge, or his authorized assistant or superintendent.

Excavation.

Excavate the entire area of the building to the bottom of the foundation. Excavate for all side walls to the depth shown on the plan and sections; the office and boiler-room to be excavated to the depth of the floor line of the same, as shown on plans. With the excavated earth, grade around the completed building to the level of the line marked "ground line." On the completion of the work, remove all rubbish or unused material.

Stone work.

All stone, unless otherwise specified, to be of good quality local stone, of hardness and durability approved by the engineer.

FINAL PRECIPITATION CHAMBER.

Walls.

The outside walls and the inner division walls to be two feet (2 ft.) thick, and of the depth shown in drawing, faced with hard burned Croton brick or blue stone.

The top of all walls to be capped with blue stone four inches thick and thirty inches wide.

Piers.

Piers to be twelve (12) inches square, of hard-burned brick; to be capped with a block of blue stone four (4) inches thick.

Sludge pits to have the sides constructed of twelve-inch (12 in.) brick work.

Cover of final precipitation tank.

Furnish and set ten and one-quarter ninety-pound I beams, as shown on plan. Provide materials and build eight-inch brick arches between same, except in four corners, where provide man-holes, 6x12, with sliding covers and trolleys, as shown, for settling tanks; build twelve-inch bridge walls on outside of said man-hole openings and level up to the top of arches with Portland cement

concrete, composed of one part cement, one part sand, four parts gravel, or broken stone, as shown on plans or directed by superintendent, to form drainage beds for sludge.

Bottom.

The bottom of all tanks to be covered with Portland cement concrete, eighteen (18) inches deep and graded as shown.

Outlet chamber.

To be built as shown in the drawing; the outside walls to be of hard-burned brick sixteen (16) inches thick.

Cement mortar.

All walls and piers to the height of the top of cross-walls to be laid in mortar, composed of one part Portland cement and two parts sharp, clean sand; work above this point to be laid in Rosendale cement, mixed in the same proportion.

Concrete.

To consist of one part Portland cement, two parts sand, and three parts broken stone.

Plastering.

The entire inner surface of tanks to be covered with one coat of Portland cement mortar, if brick is used, as above specified, after all apparatus has been placed in position.

Paint.

The entire inner surface, to the height specified for blue stone, to be covered with two coats of asphalt paint.

Setting apparatus.

The contractor will furnish and set all apparatus, as hereinafter specified.

SETTLING CHAMBERS.

Stone work.

The outside walls of the precipitation chamber, on the inside and both sides of the various division walls, to a height of three feet above the grade line of same, to be faced with hard pressed brick or blue stone, laid as above specified.

Inlet man-hole.

To be constructed under the direction of the engineer, and of the same form and dimensions as the above specified outlet man-hole.

Floor and covers.

The settling chamber to be covered with a sliding floor, as shown in drawing No. 2 and in detail in No. 3; the I beams, upon which the floor will rest, to be bolted together at the ends with a fish-plate, and also secured to the outer division wall; the ends to be bedded in outside walls; all the iron work in the floor to be of good quality of wrought iron, excepts the wheels, which may be cast.

The wheels to be well turned and perfectly centered; the wood work of the floor to be of Georgia pine boards, tongued and grooved, and not more than four inches wide. All the covers to work smoothly and be moved to their full length with properly rigged tackle, to be operated by one man.

Paint.

The entire inner iron work to have one coat of asphalt paint.

SUPERSTRUCTURE AND OFFICE BUILDING.

Foundation.

Those portions of the foundation not included in the settlement chamber to have a depth six (6) feet below the ground line, or three and one-half ($3\frac{1}{2}$) feet below the flow line of the sewer; to be of rubble stone laid in Rosendale cement mortar; all foundation walls to have a concrete footing six inches wider on each side than the wall itself.

All brick walls above ground, unless otherwise specified, to be twelve (12) inches thick, well laid in cement mortar.

In the main building the wall under the two twenty-inch girders to be strengthened with a pier twenty-four inches square.

Chimney.

To be of twelve-inch brick for lowest fifteen feet, then eight-inch, thirty-six (36) inches square, for the least size outside, and smoothly plastered on the inside; to rest on stone foundation four feet square, extending to the bottom of the outer wall.

Cut stones.

Water table and sills to be of lime stone, cut in strict accordance with drawings.

Cement floor.

The boiler-room to be provided with a Rosendale cement floor, laid on a concrete foundation six inches thick; the various exposed walls of the boiler-room, for a height of eight feet, to be plastered with cement mortar.

CARPENTER'S WORK.

Roofs.

All roofs of office building to be covered with first quality slate. Unless otherwise specified, as shown on the drawings, the roof boards to consist of one inch hemlock, tongued and grooved; to be covered with one thickness of extra heavy building paper; the roof joists to be 2x10 inch spruce or Norway pine, spaced twenty-four inches at the foot resting and secured to a plate wall six inches thick and shaped to join a cornice as shown.

The roof joists of the remainder of the building to be of 3x12 timbers of the same material, spaced eighteen inches center to center, to rest on a 6x10 wall plate, and, where possible, secured to ends of floor joists.

The roof of the settlement chamber to be of the same materials.

Outside walls.

All the outside walls to be of brick, as shown in the drawings, with joints neatly pointed. Gutters, etc., according to drawing, and flashed with V. F. tin.

Floors.

All the floor to be of one and one-quarter inch plank of Norway pine, tongued and grooved, with floor timbers as shown in the drawings. The lower floor of the office rooms to be of Georgia pine, seven-eighths of an inch thick and not more than three inches wide. Floor beams and joists to be in accordance with drawing No. 4.

Windows and doors.

Window and door frames and window-sashes to be of clear white pine. Window glass of double thick of size shown. All windows and doors to be fitted with locks, hinges and other hardware of a form and quality to be approved by engineer. All

inside panel doors to be of clear white pine one and one-half inches thick and all batten ones of Georgia pine two and one-half inches thick.

Office finish.

The interior of the room marked "office" on the ground floor will be wainscoted for a height of five feet in Georgia pine, in pattern approved by the engineer, and the remainder plastered with a lime mortar.

Water tank.

The water tank to be of stone 20x10x5 feet, built on top of adjacent hill and covered with a frame building, full size of tank and seven feet high at eaves, fifteen feet at peak as per drawing. The outlet of the tank to be a four-inch wrought-iron pipe and extending as hereinafter described. The tanks to be furnished with suitable electric registers and gauges leading to the engine-room. Pump with portable boiler set on one base.

Valves and fittings.

This boiler to be provided with one safety valve one and one-half inch in diameter, set to blow at ninety pounds (unless otherwise ordered).

One steam gauge, six inches dial.

One stand pipe, with large-sized glass water gauge, fitted with independent cleaning pipes and valves, and three patent gauge cocks.

One check valve, one inch diameter.

One stop-valve, one inch diameter.

One blow-off valve, two inches diameter.

The necessary pipes and fittings for connecting all the above to the boilers.

Tools.

One steel wrench fitting the handhole nuts, one tube scraper with handle, set of fire tools, consisting of slice bar and hoe, and hose and pipe for blowing dust from exterior of tubes, to be furnished.

Testing.

To be tested and made tight under a hydraulic pressure of 150 pounds per square inch.

Quality.

All materials and workmanship to be first-class in every particular.

Weight.

Approximate weight, 5,000 pounds.

Steam pump.

Furnish and set up one Duplex Dean steam pump with steam cylinder ten inch, water six-inch and ten-inch stroke, and make suitable connections with boiler and exhaust.

Furnish and lay five feet below the surface, a six-inch cast-iron suction pipe to the river, and construct entry chambers according to directions of the engineer. Connect pump with water tank at bottom with a four-inch wrought-iron pipe fitted with one four-inch gate valve near pump. The four-inch force pipe to have T connections of the proper size, with office, plumbing and chemical tanks. Construct masonry foundation for pump, according to direction of engineer.

Fire plug.

Place on pump side of valve one four-inch fire plug, fitted with gate valve. Furnish 200 feet of two and one-half-inch best quality linen hose, with nozzle and connections complete.

Pipe lines.

Run a two-inch galvanized iron pipe from convenient point on force main through the main building; connect this at proper points by means of one-inch wrought-iron pipe with chlorine generator, iron tanks and lime tanks.

Centrifugal pump.

Furnish and set up on proper masonry foundation two Baldwinsville Horizontal Centrifugal pumps No. 5, with engines. Connect primers of pump by one-inch galvanized-iron pipe, with globe valve, to force main. Lay one four-inch line of force and one four-inch suction main along outer wall of main building, and connect the same as follows:

The suction main to be connected by three-inch pipe, furnished with proper gate valves with each of the four sludge pits. The bottoms of the suction pipes to be fitted with screens. The force main is to be connected by three-inch pipe, with each of the two main divisions of the settlement tank, and supplied with valves. All the above pipes to be of galvanized iron.

Hoist.

Furnish and fit up one hand hoist selected by engineer.

Iron stairs.

Provide in each tank, at place directed by the superintendent, one iron stairs from beneath tank covers to floor of tanks.

PLUMBING.

Water-closet.

Furnish and set up in room above office one water-closet, with cistern complete, and connect same with water supply with three-fourth inch AA lead pipe. Furnish and set up one 20x36 inch cast-iron sink in position designated by superintendent; soil pipe to be four-inch cast-iron; carried through roof and extending below ground inside of wall; to be connected with sewer by means of four-inch iron pipe at a point outside of building.

STEAM HEATING.

Settlement tanks.

The settlement tanks to be heated by wall coils placed according to directions of engineer; to consist of one one-half inch steam pipe with two-inch headers; the total heating surface of coils to be 500 feet, but each coil to have not more than 100 square feet of surface; the supply and return mains to be of two-inch pipe, connected at the end with pipe of the same size; all the system to be placed as high as the space will allow; the main riser from the boiler to have a relief pipe outside of the valve connected with return.

Engine-room.

To have one cast-iron vertical tube radiator of 100 square feet surface.

Office.

To have two cast-iron vertical radiators of fifty square feet each.

All the above work to be done in such a manner that it will work perfectly at steam pressure of from three to eighty pounds. The supply and return to office to be two-inch pipe. All to be fitted with the necessary valves and other fixtures.

Tram-way and dump cars.

Furnish sixty-pound rails clamped to top of iron beams the entire length of tanks on each side. Rails to be laid two feet to centers, and all fastenings, bearings, etc., necessary to be provided. Furnish two one-fourth inch boiler-iron dump cars of one-ton capacity each to fit said track.

Overhead tram-rail.

Furnish and fit upon each side of building overhead tram-rails, one ton capacity, with one four-ton self-dumping steel buckets and differential one-ton hoisting blocks, chains, etc., complete. The whole to be so arranged as to allow of dumping the contents of buckets into the dump cars on tram-way.

Patented appliances.

Furnish the following patented apparatus, with the right to the perpetual use of the same.

Iron tanks and Powers' chemical tanks.

Furnish and set where directed two 2,000-gallon wrought-iron riveted tanks, one-half inch plate for chemical reservoirs; also, Powers' automatic chemical supply tanks, with all connections and appurtenances complete.

Lime tanks.

Furnish and set two Powers' patent wrought-iron riveted lime tanks, 10x2x1½, with automatic ratchet, feeding valve and all connections complete.

Powers' chlorine generator.

Furnish and set four sets of Powers' patent chlorine generators, with chemical reservoirs and connections to all tanks; also perforated lead pipes on two sides of all tanks; each set of generators to be arranged so it can be used separately or collectively, and in one or all settling tanks; supply all valves, pipes, indicators, fastening and appurtenances necessary to properly and thoroughly complete the whole.

Screens.

Furnish and set four bar-screens and two mesh-screens with cast-iron frame, size shown on plan; bar-screens to be one-half inch bar; mesh to be one-eighth inch wire, one-inch mesh, all galvanized.

"T" overflow castings.

Furnish and set two cast-iron T overflow castings 4x1 feet, as shown in plans, and furnish and set two ten-inch galvanized-iron Powers' patent syphons, two twelve-inch Powers' patent siphons, where shown on plan.

Iron valves.

Furnish and set eight-inch brass-trimmed iron valves, with iron pipe connections, where shown on plans; each valve so fitted as to be readily opened or closed from the surface of tanks.

It is the intention of this specification that the contractor shall furnish and fit up all the necessary apparatus to fully equip, ready for practical operation, a complete plant of the size shown for the settling, straining, chemical treatment, and automatic discharge of sewerage. Also, special fixtures for the removal of the sludge to drainage beds, and water from tanks as specified. All fixtures incidental thereto are understood to be included, whether mentioned in this specification or not.

Also to furnish perpetual license from the patentee to use in the plant constructed under this agreement any or all sewage construction patents held by him or any improvement thereon which he may make.

Pump-house specifications.

The pump-house will be built of the size of the sewage disposal building and the 50x50 tanks, as shown on plans, and in accordance with the specifications therefor, in so far as they refer to said building and tanks, including the plumbing and steam-heating.

The depth of the tanks shall be eight feet below the invert of the sewer.

The following described boiler and pump shall be furnished and set in the boiler-room:

Boiler.

The contractor will furnish and set one Babcock & Wilcox water tube boiler of twenty-five horse-power, with all necessary brick and mason work, according to drawings and specifications, and connect said boiler with pumps.

Sections.

This boiler to be composed of six sections or slabs, each section to be composed of eight best lap-welded wrought-iron tubes, three (3) inches in diameter, and eight (8) feet long, connected at the

end by continuous stagger-headers, or "up-takes" and "down-takes;" the tubes to be fastened therein by being expanded into tapered holes.

Headers.

Each "header" to be provided with hand-holes placed opposite the end of each tube, of sufficient size to permit the cleaning, removal, and renewal of a tube through the same. Each hand-hole provided with a cap fastened with wrought-iron bolt and clamp and cap-nut.

Joints.

All joints being made tight without packing of any kind.

Connection.

The several sections to be connected at each end to one steam and water-drum, and at one end with a mud-drum, by means of lap-welded wrought-iron tubes, three (3) inches in diameter and of suitable length, expanded into bored holes.

Drum.

The steam and water drum to be twenty-four inches in diameter and ten and one-half feet in length, made of O. H. steel five-sixteenths inch thick, in three sheets; the longitudinal seems double-riveted.

Man-hole.

To have a man-hole in the center sheet. The heads to be of wrought-iron, with an opening at each end of drum, one for safety valve and one for taking off steam, three inches in diameter.

Mud-drum.

The mud-drum to be of cast-iron, twelve inches in diameter and thirty-six inches long, with one hand-hole and one nozzle for blow-off pipe, two inches diameter.

Valves and fittings.

This boiler to be provided with one safety valve, one and one-half inch in diameter, set to blow at ninety pounds (unless otherwise ordered).

One steam gauge, six inches dial, one stand pipe, with large sized glass water gauge, fitted with independent cleaning pipes

and valves, and three patent gauge cocks, one check-valve, one inch diameter, one stop-valve, one inch diameter, one blow-off valve, two inches diameter, one stop valve, three-quarter inch diameter. The necessary pipes and fittings for connecting all the above to the boilers.

Front.

The front of this boiler to contain one fire door with register, one double ash-pit door, and large door for access to the ends of the tubes. All parts to be ample in strength, joints fitted.

Fixtures.

The fixtures for this boiler to consist of a full set of grate bars with bearers, dead plate and girders, flame bridge plates with bolts and special fire brick for lining the frame bridge, binders and bolts, one ash and two cleaning doors for access to the exterior of tubes for cleaning, one damper with frame, and the requisite T and C bars for openings in the walls; C's and anchor bolts for front.

Tools.

One steel wrench fitting the hand-hole nuts, one tube scraper with handle, set of fire tools, consisting of slice bar and hoe, and hose and pipe for blowing dust from exterior of tubes, to be furnished.

Testing.

The sections and mud-drum to be tested and made tight under a hydraulic pressure of 300 pounds per square inch, and the steam and water drum to be tested and made tight under a hydraulic pressure of 150 pounds per square inch.

Quality.

All materials and workmanship to be first-class in every particular.

Weight.

Approximate weight, 11,000 pounds.

The pump shall be a duplex Deane pump 12x14x18, with special valves as shown on drawings.

The necessary valves and pipes shall be furnished and set so as to connect the pump to the pump-well and force main by eight-inch suction and force-pipes.

All of the work shall be completed so as to insure the proper working of the boilers and pump, and all rubbish removed from the works or adjacent grounds.

WM. B. LANDRETH,
Engineer, Schenectady, N. Y.

June 26, 1889.

CONTRACT FOR THE CONSTRUCTION OF SEWERS AT WHITE PLAINS, WESTCHESTER COUNTY, N. Y.

This agreement, made and concluded this .... day of ...., 1889, by and between the board of trustees of the village of White Plains, N. Y., of the first part, hereinafter called the board, and ...., of the second part, hereinafter called the contractor, witnesseth :

1. The said party of the first part has let and awarded to the party of the second part, and in consideration of the covenants and agreements herein contained and .... on the part of the party of the second part, to be kept and performed by ...., hereby does let and award to the said party of the second part the contract for furnishing all materials and labor required for the construction of that portion herein described, of a system of sewers, sewage disposal works, and pump-house, in the village of White Plains, N. Y., according to the plans and specifications on file in the office of the clerk of the board of trustees of said village.

And the said party of the second part, in consideration of the letting and awarding to ...., of this work and contract, and in consideration of the payment hereinafter mentioned to be made to ...., by the party of the first part and under penalty expressed in a bond for .... thousand dollars with sureties approved by the board of trustees, bearing even date with these presents and hereunto annexed, hereby agree .... at .... own proper cost and expense to do all the work and furnish all the materials hereinafter set forth for the proper construction of a system of sewers complete, sewage disposal works, and pump-house, and to furnish and complete the same on or before the first day of January, 1890. The work shall be begun within ten days after notice to that effect has been sent to the contractor by the board. The sewers on

Railroad and Lexington avenues shall be completed by September 15, 1889.

2. And the party of the second part further agrees that should the work of construction not be completed by the time aforesaid, the party of the first part shall have the right to employ men and purchase materials and complete the same. Should the cost of such work and materials be less than the same figured at contract prices, the difference shall be paid to the aforesaid part.... of the second part by the said party of the first part. But should the cost be more than the contract prices, the difference of cost shall be deducted from any money due the part.... of the second part from the party of the first party; or should the money due or retained prove insufficient, the same will be a charge upon the bond accompanying this agreement.

3. And do further agree that the said trustees shall be and are hereby authorized to appoint a chief engineer of said sewer works, who may appoint such assistants and inspectors as may be necessary to inspect the works to be done under this agreement and to see that the same strictly corresponds with the specifications hereto annexed.

4. To prevent all disputes and litigation it is further agreed by and between the parties to this contract that the engineer of said White Plains sewer works shall in all cases determine the amounts of work to be done which are to be paid for under this contract, and he shall decide all questions which may arise relative to the execution of this contract, on the part of the contractor, and his estimates, directions, and decisions shall be final and conclusive.

5. The approximate amount of work to be done is shown on a certain map and certain profiles, filed in the office of the clerk of the board.

The board reserves the right to increase or diminish the amount of work to be done under this contract to any extent not greater than one-half of the money value of the entire work.

6. The party of the second part shall perform such extra work as the engineer may deem necessary for the proper completion of the work.

7. The engineer shall estimate the actual cost of such extra work with the addition of fifteen per cent as profit and the compensation for wear of tools. But no single piece of extra work, of which the money value is more than fifty dollars, shall be done

by the contractor, except under the direct order of the board of trustees and communicated to him through a written notice from the clerk of said board. No work that can be classified or paid for under this contract shall be classed as extra work.

It is understood that whenever "specifications" are mentioned, the specifications adopted by said board on file in their office are referred to of which a copy is hereunto annexed, which are also a part of this contract.

PAYMENTS HOW MADE.

8. Cash payments will be made monthly on the estimate of the engineer equal to eighty per cent of the work done during that time at contract prices. The engineer will only include in his monthly estimate such work as is completed and left in a neat and passable condition to be hereinafter mentioned. Ten per cent will be paid the contractor on the completion of the work when certified to by the engineer and accepted by the board of trustees, and on the presentation of a certificate from the street committee of said board of trustees that the roadways are in a good condition. The remaining ten per cent subject to the conditions hereinafter mentioned, will be paid six months thereafter.

REPAIRS TO SURFACE OF STREETS.

9. If, at any time after the completion of the work and acceptance by the trustees and before the date on which the payment of the final ten per cent is to be made, the surface of the streets or any part of the work herein contracted for should require repairs, the trustees shall notify the contractor to make such repairs, either in person or by mail. Should the contractor fail to make the repairs required within ten days after the date of such notice, the board of trustees shall cause the said repairs to be made and the cost thereof shall be deducted from the retained ten per cent.

10. And the said trustees hereby agree, upon the expiration of the said period of six months, provided that the work shall at the time be in good order, and provided no claims or demands shall have been made upon said first party by reason of or growing out of said work, that the said part .... of the second part shall be entitled to receive the whole of such part of the sum last aforesaid as may remain after the expense of making the said repairs, in the manner aforesaid, shall have been paid therefrom.

Responsibility of Contractor for Claims.

11. It is agreed that the said contractor shall hold the said board of trustees harmless against all claims for labor done or materials furnished on account of this contract, and shall furnish satisfactory evidence, whenever called upon to do so, that all such claims have been paid.

Responsibility of Contractor for Damages.

12. The contractor shall be responsible for all damages to life or property due to work performed by him in the construction of the sewers, and shall indemnify and save harmless the said trustees and from all suits or actions of every name and description brought against the said trustees for or on account of any damages received or sustained by any party or parties by or from the said part..... of the second part, ... servants or agents, in the construction of said sewers, or by or in consequence of any negligence in guarding the same, or any improper materials used in its construction, or by or on account of any act or omission of the said part..... of the second part or .... agents, and for the faithful performance of this contract by the part.... of the second part; and the said part.... of the second part hereby further agrees that so much of the money due to .... under and by virtue of this agreement, as shall be considered necessary by the said trustees, may be retained by the said party of the first part until all such suits or claims for damages, as aforesaid, shall have been settled and evidence to that effect furnished to the satisfaction of the said trustees.

Force Insufficient.

13. If the engineer should at any time be of the opinion that the work is unreasonably or unnecessarily delayed or that the contractor is not on his part fulfilling this contract, or that the force employed is not sufficient to complete the work within the time herein provided and should so certify to party of first part in writing, the said first party shall thereupon require said second party to proceed without delay with such force as they shall direct, and in case of his refusal or neglect to comply with such requirement, the said first party may take possession of and complete the work at the expense of said contractor as herein

provided in case of failure to complete the work. But should the work be delayed or interrupted by order of the trustees, after the service of such notice, the contractor shall be entitled to an extension of time equal to the time of such interruption or delay, which shall be determined by the engineer; the time of beginning, rate of progress, and time of completion being essential conditions of this contract; and if the contractor shall fail to complete the work by the time above specified, the sum of twenty-five dollars per day thereafter, until such completion, shall be deducted from the moneys payable under this contract. The sum shall be in addition to any penalties otherwise specified, and shall be paid by said party of the second part to the party of the first part, in the event of a failure to complete said work as herein agreed, and in no event as a penalty, but to the full amount thereof, and in addition to any other damages sustained or agreed upon.

NO CHARGE FOR DELAYS.

14. No charge shall be made by the contractor for hindrances or delays from any cause during the progress of any portion of the work embraced in this contract.

NO VARIATION IN PRICES.

15. No variation from the regular prices made in the proposal will be allowed. The trustees will not consider themselves bound to notify or inform contractors where material that is hard or expensive to excavate occurs or will be liable to be encountered.

16. The said part.... of the second part hereby agree that .... will give .... personal attention to the fulfillment of this contract, and that........will not sublet the aforesaid work, but will keep the same under......... control, and that........will not assign by power of attorney, or otherwise, any portion of the said work, unless by and with the previous consent of the trustees, to be signified by indorsement on this agreement.

17. And the said part......of the second part hereby agree to receive the following prices as full compensation for furnishing all materials, and for the use of tools, forms and other implements, and for all labor in moving materials and executing all the work contemplated in this contract, for all bailing and draining,

and for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen obstructions or difficulties which may be encountered in the prosecution of the same; and for all risks of every description connected with the work; and also for all expenses incurred by or in consequence of the suspension or discontinuance of said work — in case the trustees shall so direct — and for well and faithfully completing the work, and the whole thereof in the manner and according to the plans and specifications and the requirements of the engineer under them for the following prices, to-wit:

For each foot of twenty-four-inch iron pipe sewer complete,
For each foot of twenty-four-inch vitrified pipe sewer complete,
For each foot of eighteen-inch vitrified pipe sewer complete,
For each foot of fifteen-inch vitrified pipe sewer complete...
For each foot of twelve-inch vitrified pipe sewer complete...
For each foot of ten-inch vitrified pipe sewer complete......
For each foot of eight-inch vitrified pipe sewer complete....
For each foot of four-inch vitrified house sewer complete ...
For each foot of eight-inch vitrified house drain complete...
For each foot of eight-inch iron force main complete ....
For the disposal works complete ....
For the pumping works complete........................
For each man-hole complete ....
For each flush-tank complete............................
For each lamp-hole ....

In witness whereof, the parties heretofore mentioned have hereunto set their hands and seals on the........day of.........
in the year one thousand eight hundred and eighty-nine.

(Signed.) ... .

....

....

Trustees.

....

Contractor.

Witnesses:

....

....

NOTICE TO CONTRACTORS.

No. ......

Sealed proposals for the construction of sewers, sewer appurtenances, and sewage disposal works, in the village of White Plains, N. Y., will be received at the office of L. C. & W. P. Platt, White Plains, N. Y., and should be addressed to Ffarrington M. Thompson, clerk of the village of White Plains, and the said board of trustees of said village will meet at 8 o'clock in the evening on the 22d day of July, A. D., 1889, at the village rooms, Grand street, in said village, to open said bids.

The work to be done is shown on a sewerage map and plan on file in the office of said clerk, and must be in accordance with the specifications accompanying said map and plan.

The work will comprise in general the following quantities:

Quantities of material and labor.

	Feet.
Twenty-four-inch iron pipe outlet	6,400
Twenty-four-inch vitrified pipe outlet	3,600
Eighteen-inch vitrified pipe sewer	920
Fifteen-inch vitrified pipe sewer	5,682
Twelve-inch vitrified pipe sewer	2,400
Ten-inch vitrified pipe sewer	4,597
Eight-inch vitrified pipe sewer	36,224
Eight-inch vitrified pipe drain	11,576
Eight-inch iron pipe main	3,200
Man-holes	97
Flush-tanks	52
Lamp-holes	24

Sewerage works complete.

Pump-house, pump and boilers complete.

	Feet.
Outlet iron pipe, twenty-four-inch	6,400
Outlet, vitrified, twenty-four-inch	3,600
William street, eighteen-inch	920
Spring and North Spring street, eight-inch	1,850
Lexington avenue, eight-inch	1,850
Lexington avenue, ten-inch	977
Hamilton avenue, eight-inch	2,725
Barker avenue, eight-inch	1,642
Mott street, eight-inch	700

	Feet.
New street, eight-inch	400
Martine avenue, eight-inch	1,550
Martine avenue, fifteen-inch	165
Fisher avenue, fifteen-inch	350
Fisher avenue, eight-inch	440
Fisher avenue, ten-inch	1,090
Post-road, fifteen-inch	1,400
Post-road, eight-inch	1,800
Davis avenue, eight-inch	390
School street, eight-inch	608
Railroad avenue, fifteen-inch	753
Railroad avenue, eight-inch	2,600
Chatterton Hill road, eight-inch	1,800
Broadway, eight-inch	5,050
Broadway, fifteen-inch	400
Mamaroneck avenue, fifteen-inch	1,314
Mamaroneck avenue, ten-inch	630
Church street, eight-inch	1,450
Cottage place, eight-inch	450
Court street, eight-inch	950
Grand street, eight-inch	900
Grove street, fifteen-inch	550
Grove street, eight-inch	1,250
Winchester avenue, fifteen-inch	750
Winchester avenue, eight-inch	500
Brookfield street, eight-inch	2,002
Central avenue, ten-inch	1,900
Orawaupum, eight-inch	1,432
Madison avenue, eight-inch	820
West Madison avenue, eight-inch	1,432
Highland park, eight-inch	805
Home street, eight-inch	500
East Washington street, eight-inch	500
Westchester avenue, eight-inch	3,100
Lake street, eight-inch	1,250
Barker avenue, eight-inch	500
Warren street, eight-inch	400
Kensico avenue, eight-inch	1,750
Outlet Lake street to Westchester avenue, twelve-inch	2,400

Each proposal shall be signed by the bidder and accompanied by a certified check or cash to the amount of $2,000, made payable to the board of trustees, conditioned upon the execution of the required contract, and the required bond for the faithful performance of the terms of the contract in case of award.

The person or persons to whom the contract may be awarded will be required to appear at the above-named office with the sureties offered by him or them, and execute the contract and bond within five days from the date of the award; and in case of failure or neglect so to do, he or they will be considered as having abandoned it, and as in default to the board of trustees.

Permission will not be given for the withdrawal of any bid or proposal after the same has been opened by the clerk of said board.

The adequacy and sufficiency of the securities offered, are to be determined by said board.

All proposals must be on blanks furnished by said board and all other bids will be considered informal.

Each proposal must cover the entire work, and no partial bids will be received.

The prices stated are to cover the expense of furnishing all materials, tools and labor, for completing the work aforesaid, in conformity to the contract and specifications prepared for the same.

The amount of the security will not be less than one-half of the estimated value of the work. The board of trustees reserve the right to increase the amount of security, after the proposals are opened, to any sum not exceeding the amount of the contract.

The estimated quantities are approximate, and the board reserves the right to increase or diminish the same, as may in their judgment be necessary.

The board of trustees reserve the right to reject any or all bids.

(Signed,) ....

President of Board of Trustees.

....

Engineer.

WHITE PLAINS, N. Y., A. D., 18 .

PROPOSALS

Proposals for the construction of sewers, sewer appurtenances and sewage disposal works, for and in the village of White Plains, N. Y.

Made by..

Residing in..

To the board of trustees of the village of White Plains, N. Y.

.... do hereby declare that .... the only person interested in this proposal, and that no other person has any interest in this proposal, or in the contract proposed to be taken, that it is made without any connection with any other person, persons or firm making proposals for the same work, and is in all respects without collusion or fraud.

And .... do further declare that no person acting for or in the employ of the village of White Plains is directly interested in this proposal.

And .... do further declare that ...have carefully examined the grounds on which the works are to be performed .... specifications and form of contract, and the drawings to illustrate the same, and that will contract to furnish all the materials, tools and labor required to perform all [illegible]

[illegible]

For each foot of eight-inch vitrified house drain, complete,
For each foot of eight-inch iron force main, complete.....
For the disposal works, complete........................
For the pumping works, complete........................
For each man-hole, complete...........................
For each flush-tank, complete..........................
For each lamp-hole...................................

The above prices are to be for the work complete, and are also to include the cost of doing all other work required by the plan and specifications, or appertaining thereto.

(Signed,) ....

Dated at..................................18 .

WHITE PLAINS SEWERS.

Bond.

KNOW ALL MEN BY THESE PRESENTS:

That we, ...
...., as principal, and.., as sureties, are firmly held and bound unto the board of trustees of the village of White Plains, N. Y., their successors and assigns, for which payment well and truly we bind ourselves, our heirs, executors, administrators, jointly and severally, firmly by these presents, sealed with our seals, dated the..... ..day of.....18..

WHEREAS, the said.......................................
ha.. entered into a contract with the board of trustees of the village of White Plains, N. Y., bearing date the........of......
18.., and hereto annexed:

Now the condition of this obligation is such that if the said
....
shall well and truly keep and perform all of the terms and conditions of the said contract on ...... part to be kept and performed and shall indemnify and save harmless the said board of trustees and the village of White Plains as herein stipulated, then this obligation shall be of no effect, otherwise it shall remain in full force and virtue.

[SEAL.] ....

Sealed and signed in the presence of

....

....

Declaration.

The undersigned..

....

each for himself, doth declare and affirm that he is a resident as respectively stated above, and is worth not less than............ .... dollars over and above all his debts and liabilities and property by law exempt from executions and that they each executed the above bond.

(Signed,) ....

....

Witness:

....

....

REPORT ON POLLUTION OF BRONX RIVER.

White Plains, N. Y., *July* 11, 1889.

Lewis Balch, M. D., Secretary State Board of Health, Albany, N. Y.:

Dear Sir.— In response to your telegram of yesterday I have to-day examined the Bronx river below White Plains, with reference to its use for drinking purposes. I have had interviews with the occupants of nearly half the buildings on the banks of the stream with the following result:

At Tuckahoe an arm of the river is used as an ice pond. Below this pond the stream is still further polluted by the discharge from a rubber factory and by several barns and privies. The mill does not use the water for potable purposes. At Bronxville a tannery uses the water from a well, and also has a connection by a two-inch pipe with the Bronx. The water is used by the operatives at times in the cooler seasons when it happens to be more convenient than the well. It is not used for drinking purposes in summer on account of its warmth. The engineer at the tannery informed me that he formerly lived on the bank of the stream above, and that he had then used the water for domestic purposes, but had stopped using it before he removed from the house on account of the filth which he knew was thrown into it at White Plains and other places. The stream is here still further polluted by barns, privies and refuse from the tannery. Mount Vernon has a water supply obtained from another source. The river is here polluted by drains, barns, privies and discharge from

factories. At Woodlawn I found one house where the water was used sometimes in winter. They "would not use it in summer' for drinking. It is also warmer than the spring water they can use, but is more convenient of access. At Bronxdale there are two mills, one a bleachery, whose discharges discolor the water considerably. The ponds above these mills were formerly used as ice ponds, but they now belong to the Bronx River Park, and their use is said to be prohibited by the park commissioners. The water is not used in the mills for drinking except possibly in winter by some one because it is a little more convenient than the well. At West Farms are two mills whose pond was also used as an ice pond, but this use has also been prohibited by the park commissioners. It is possible that the people in perhaps as many as half a dozen houses not visited use the water to some extent for household purposes.

From my observation of the condition of the creek running through White Plains I am disposed to think that the condition of the water in the river will be improved by the construction of the system of sewers and the attendant purification of the sewage before discharge into the river.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

PLANS

FOR

Sewerage of the Village of Waterville.

REPORT OF W. B. RIDER, ENGINEER.

To the President and Trustees of the Village of Waterville:

GENTLEMEN. — Having completed the surveys of the village for a system of sewers, I hereby submit the following report in connection with the map and profiles of the several streets within the corporation.

The map shows the line and direction of sewers, location of man-holes, and general contour levels, which latter have been taken in the center of the streets at regular intervals of 100 feet or oftener.

A great deal of extra work has been done to ascertain elevations in fields aside from streets.

The profiles show the present surface of the streets by the black shaded lines, the grade of the center of the sewers by red full lines, and the location of the man-holes and flush-tanks by red vertical lines. The dotted black lines denote grades that I would recommend for the surface of the streets on which they are drawn. These, if adopted, would be beneficial in many ways, especially in the case of walks and fences which should be permanently fixed with respect to certain uniform and established grades. In the shaping of the several streets, if these lines were followed, they would be graded by making all repairs by cutting knolls and filling depressions until all would be brought to their respective grades. I have designed all sewers to carry the waste water from sinks, laundries, bath rooms, etc., as well as all roof water, but not surface water from the streets. I recommend to extend the outlet as planned, with a storm overflow in the future, and to buy a piece of land, say one acre, to put in precipitation basins to filter the sewage, as this will eventually have to be done. For a long time to come the small amount of sewage will do no harm, the stream running as it does over a rocky bottom for

several miles and there is no place that takes water from it before it reaches Albany.

The topography of the village is such that sewers are needed very much, and fortunately all sewers will discharge into one outlet near the business center, making only one trunk sewer necessary.

The sewer on Main street, from Mill street to the junction of Sanger street and Tower avenue sewers for 500 feet should be assessed on Main, Sanger, Madison, Cross street and Tower avenue, as all these empty into it. The sewers on Bacon, Union, Hooker street and Stafford avenue, will, of necessity, have a separate outlet to connect with the main trunk sewer at Mill street. This same outlet or connecting link must finally take the sewage from the most of Elm and Conger streets, and run nearly as shown by the dotted line on the map.

The main sewer from Main street through Mill street, should be paid for by the village, as all other sewers flow directly into it or nearly so, at its head.

For some time to come the surface water on White street, or most of it, and Main street, can run into the sewer.

I also recommend that your present drains be fitted with good catch basins and trapped, as some emit a strong stench.

There should be a change in the drainage of the land lying between White street and Putnam avenue, as at present it forms three distinct cess-pools, as it were, and is very injurious to the public health.

In this connection I will speak of the pollution of the wells in the village. The streets are all located in such a way as to have every well contaminated from the surface, with only one exception, that being the small ridge north of Tower avenue and west of brook.

The surface drainage passes from R. Tower's barns across Tower avenue, thence across to Madison street, thence along the low land at trotting park, taking also the drainage from Curtis and Terry's farms across to Sanger street, and all wells in its path receive their share of pollution.

A number of stables and outbuildings also add to the impurities in the wells between Madison and Sanger streets.

The eastern and southern portion are affected as follows:

Starting on Livingston and Burdick hills, the drainage flows to White street at Livingston street, thence crossing the path of

barns and outbuildings to South street, where it turns and sweeps across White street and Putnam avenue, finally emptying into the stream between Putnam avenue and Hooker street, and no well along this path is free from pollution, not excepting those on Main street.

On the northerly side we find a large cemetery on the highest ground, with its underground drainage crossing all the adjacent streets — Hanover, Bacon and Union — which streets lie on three sides of the cemetery and on a lower level than it.

There are many places that I have seen where slops and filth are carelessly thrown on the ground and left to flow directly to a neighboring well. I call to mind one well the water of which, though highly recommended by its owner, proved to be badly impregnated and was pronounced by experts to be unfit for domestic use. I assume this one to be a fair sample of all the wells in the village.

Sewers to prevent this are an absolute necessity.

The brook between Main and Bacon streets should be straightened and confined to a narrow limit or channel and the dumping of garbage into it prohibited at once. This stream, where low, can be taken into the sewer at Stafford avenue, with a proper catch-basin.

I would recommend also that a copy of the plans and profiles be prepared and sent to the State Board of Health for any further suggestion or change deemed advisable by them.

Yours respectfully.

WILLIAM B. RIDER,
Civil Engineer.

ESTIMATE OF AMOUNTS.

2,750 lineal feet of twenty-inch outlet.
500 lineal feet of fifteen-inch outlet.
2,500 lineal feet of twelve-inch outlet.
3,000 lineal feet of ten-inch outlet.
1,400 lineal feet of eight-inch outlet.
17,400 lineal feet of six-inch outlet.

27,550 lineal feet, 5.218 miles nearly.
Ten twenty-inch branches.
Ten fifteen-inch branches.

Fifty twelve-inch branches.
Sixty ten-inch branches.
Twenty eight-inch branches.
One hundred and seventy-four six-inch branches.
Fifty man holes, including flush-tanks.
Eight flush tanks.

ESTIMATE OF COST.

Main trunk sewer	$5,125 00
Small trunk sewer referred to	1,500 00
Hanover street sewer	1,170 00
Bacon street sewer	980 00
Stafford avenue sewer	1,966 00
Union street sewer	890 00
Hooker street sewer	1,050 00
Main street to Putnam avenue	1,112 00
Putnam avenue	1,200 00
Elm street flowing to Putnam avenue	540 00
Academy street	350 00
White street to academy	1,013 00
White street academy to railroad	564 00
White street railroad to brow of hill	1,385 00
South street	865 00
Livingston street	300 00
Main street to Sanger, etc	815 00
Sanger street to Madison street	449 00
Sanger street to balance	2,832 00
Madison street to Cross street	1,225 00
Tower avenue to Thirty-first street	1,470 00
	$26,801 00

RECAPITULATION.

Sewers and man-holes	$26,801 00
Eight flush-tanks	680 00
Branches	392 62
	$27,873 62
Add for superintendence and incidentals	2,787 38
	$30,661 00

REPORT OF CHAS. C. BROWN, CIVIL ENGINEER.

UNION COLLEGE,
SCHENECTADY, N. Y., *July* 1, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health:*

DEAR SIR.—I have examined the village of Waterville and the plans proposed for its system of sewerage and would make the following report:

I find the general plan fits the ground in the village very well and will without doubt answer all the requirements that should be made of the system. It is proposed to empty the outlet sewer into the east branch of Oriskany creek below the village. This creek was estimated, on the day of my visit, to be discharging about 2,500 [illegible] feet a minute. This amount is probably at least double the [illegible] and may be [illegible] than that. One branch of the creek [illegible] for a time as explained [illegible] fairly constant in flow except [illegible]. The fall of the creek is [illegible] the village, there being two mill-ponds [illegible]. Below the village it is said to be [illegible] nearly 1,000 feet above the [illegible] before it reaches the Mohawk [illegible]. There are some unused mill [illegible] to be about a [illegible]. The [illegible] in use is [illegible] the pr[illegible] 2,500 [illegible] polluting the [illegible] would. I [illegible]

[illegible]

mental to the public health nor injurious to the users of the stream. I think it quite probable that under the circumstances of the case below the village as reported to me, this would be true if the entire system of sewers was constructed. The village should hold itself in readiness, however, to put in a plant for the purification of the sewage at any time that a valid complaint is made. The fall in the outlet is such that this can be done without any extra expense for pipe and without throwing away any pipe laid at this time. The appearance of nuisance near the outlet would be evidence that such purification works were necessary.

It is stated by the president of the board of sewer commissioners that the sewers are designed to carry sewage and roof water, excluding surface water. This makes the outlet of quite large size (twenty inches) for so small a village with so great a fall as is here available. The surface drainage in most parts of the village is excellent, and I am disposed to think that it would be more satisfactory on the whole to exclude the roof water from the sewers, except on those streets whose surface drainage is not good, and thus reduce the size of the outlet. A hasty computation indicates that were the whole line of sewers built up as stated with a house on every fifty feet front, the outlet as proposed would not be of sufficient size at the point where the grade is lowest to carry all the roof water. The smallest size of pipe proposed is six inches in diameter. The profiles show that the upper ends of several of the branch lines are of slight grade. Experience has shown that six-inch pipe is much more subject to stoppages than eight inch. In consideration of these two facts it seems to me advisable to use no pipe less than eight inches in diameter. Flush-tanks are especially needed at the head of each of such lines of low grade. The number (8) in the plan seems small. Many engineers prefer to place man-holes at changes of alignment as well as at intersections, and at changes in inclination if they occur on long lines of pipe straight in alignment. Lamp-holes at changes in inclination are sufficient if man-holes located for other reasons are not too far distant. Probably enough can be saved by excluding a portion of the roof water and so reducing the size of the outlet, to make an increase in the minimum size of pipe to eight inches, and perhaps an increase in the

number of flush tanks and openings for inspection if thought advisable.

It is evident from the condition of the surface-drainage channels in the village that sewers to take the house drainage out of them are very necessary. The emptying of house drainage into these streams must cause great nuisance in summer, which can be abated by prohibiting the discharge into the streams. This nuisance is the greater in the stream between Hooker street and Putnam avenue, because in times of dry weather the flow of water is almost entirely under the surface, and in the other stream through the village because of the slack water in the mill pond above Tower avenue. Both of these will be cleared up by connection of the houses with the sewers, and in any event should be cleared up as much as possible by prohibiting the present discharges. The low ground between White street and Main and Putnam avenues has no outlet at present. The most satisfactory method of treating this would be to fill it up to such a level that water will drain from it. The connection of the houses, barns, and outbuildings, including their roofs, with the sewers will reduce the nuisance now produced at times, but will probably not entirely abate it.

Respectfully submitted.

CHAS. C. BROWN,

Civil Engineer.

PLANS

FOR

Sewerage of Village of Tonawanda.

CONDITIONS AND SPECIFICATIONS FOR THE BUILDING OF A SYSTEM OF SEWERAGE IN THE VILLAGE OF TONAWANDA, ERIE COUNTY, N. Y.

Conditions and Specifications.

1. *Sewer pipe.*—All pipes used shall be of the best quality of vitrified salt-glazed sewer pipe of the manufacture ordered by the board of sewer commissioners. All "Ys" and other specials shall not be less than two feet in length and of the same quality and manufacture as the plain pipe. No pipe shall be used that varies from a straight line more than three-eighths of one inch, or in which the difference in any two diameters of the same pipe is more than one twenty-fourth the regular diameter. This applies to bell as well as spigot end. No pipe shall be used that does not ring perfectly clear. No pipe shall be used that has a piece broken from the spigot end deeper than one and one-half inch or longer, measured in the middle of the fracture, than one-twelfth the inner circumference. Should the broken piece be at the bell end, the pipe must be rejected if the fracture extend into the body of the pipe, or if its length, measured as above, is greater than one-tenth the circumference. All pipe must be smooth on the inside and free from broken blisters. Unbroken blisters must not be more than one inch in diameter.

The engineer shall determine to what extent fire cracks are injurious to the pipe.

The engineer will not mark rejected pipe if the same is promptly removed from the ground. He shall have the right, however, to mark any pipe as "culled," should the contractor fail to remove it within twenty-four hours.

The price bid for sewer pipe is to include the furnishing and laying of all pipe whether plain or special. Pipe will be paid for by the lineal foot, measured in the trench. The price bid for

each "Y" branch is to be the additional price for each piece over and above the regular price per foot. The same applies to bends. Tees will be classed as "Y" branches and paid for at the same rate. The greatest number of "Y" branches will be four-inch. The price bid for each "Y" branch must include a sheet-iron cover one-twentieth of an inch thick. Earthenware covers will not be accepted.

2. *Cement.*— All cement other than Portland must be best quality "Rosendale" or other brand of equally good quality.

All cement must have a tensile strength after three days of 120 pounds per square inch.

The contractor must furnish samples for testing from each barrel should the engineer so direct. No cement must be retempered before use.

3. *Cement mortar.*— Cement mortar shall consist of one part of cement and two parts of sharp, clean sand.

4. *Concrete.*— Concrete shall consist of one part cement, two of sand and three of broken stone. The material must be mixed dry before using. When it becomes necessary to make concrete by grouting, no sand shall be used, but the grout made of pure cement.

5. *Brick.*— All brick shall be hard, well burned, of good shape, and emit a clear sound when struck together.

6. *Cast-iron.*— Shall be of the best quality, strong and tough.

7. "*Y*" *branches.*— The contractor shall place "Y" branches wherever the engineer may direct. They shall be closed with a sheet-iron cover plastered with an inch of cement.

The contractor shall allow no person to make connections with the "Y" in the street sewer except under written orders from the board of sewer commissioners. But should the line of pipe cross any private drain in such a way as to injure the same, the engineer shall have the right to direct the connection of said drain with the sewer.

8. *Iron pipe.*—Iron pipe shall be laid with lead-caulked joints. When the pipe passes under any canal or water course, the ditch shall be filled in with puddled clay and the original surface of the channel restored. No tunneling will be allowed under any tow or heel-path.

The price bid per foot of iron pipe (100 pounds pressure) must include the extra work due to its position, such as passing under

canal basins or creeks, or whenever used as an outlet, with the lead and oakum necessary.

Should any other size of iron pipe be required during the progress of the work than that bid for, it shall be paid for at a price proportional to its weight, using as a basis the price paid for forty-two inch pipe. The work for laying pipe under Erie canal will be done in accordance with the drawings and the directions of the Superintendent of Public Works of the State of New York.

9. *Sewers; how measured.*— The sewers shall be measured from the center of man-hole, flush-tank or lamp-hole or from center line of main sewer.

10. *Man-holes.*— Man-holes shall be constructed of eight-inch brick work, laid in cement mortar. They shall be plastered on the outside and washed with a coat of clear cement on the inside. They must be four feet inside diameter at the bottom and two feet four inches at the top. Cast-iron steps of the form shown on the plans shall be placed at intervals of fifteen inches.

They shall be covered with an iron cover weighing not less than 325 pounds. The sewer channel, when so ordered at the bottom with the branches, shall be of split sewer pipe filled around with concrete.

The price bid on each man-hole must include all materials of every kind and all labor.

11. *Lamp-holes.*— Lamp-holes shall be constructed by covering up straight pipe from the "Tee" in the sewer to within six inches of the surface, as shown on drawings. An iron cover weighing not less than 250 pounds shall be placed upon the brick work.

All lamp-holes shall be constructed of the same size pipe as the main sewer or branch on which they are located. The price bid for each lamp-hole to include the extra pipe required, all brick or concrete necessary and the iron cover.

12. *Flush-tanks.*— Flush-tanks shall be five-feet in diameter at the bottom, with the side carried up straight for a distance of three feet above the flow line of the pipe. They shall be of eight-inch brick work, plastered inside and out and must be covered with an iron cover of the form specified for man-holes. There must be at least four inches of brick work at the bottom. The emptying apparatus must be set according to the direction of the

engineer. The price bid on each flush-tank must include all brick, concrete and iron work, all labor, the pipe used for the overflow (without specials), and the apparatus for discharging the same. The contractor shall furnish such form of automatic flush-tank as the sewer commissioner shall direct. Cost not to exceed thirty-five dollars each. The price bid is also to include the furnishing and laying of an average of not more than twenty feet of AA three-quarter-inch lead pipe, the connecting the same with the tap in the street main (said tap to be made by the board of trustees), and a connection with the iron pipe in the tank; both connections to be made with wiped joints. The contractor must in addition furnish and set the following: One piece three-quarter-inch iron pipe eighteen inches long with brass ferrule, two elbows, one piece three-quarter-inch iron pipe twenty-four inches long, one shut-off cock with three-quarter-inch lever handle ferrule screws, one one-eighth-inch air or pet cock with three-quarter-inch male screws, one three-quarter-inch lever handle straightaway cock with one male screw and two iron staples six inches long. All cocks to be brass. The excavation for the lead pipe to be done at the regular prices bid for that class of work.

Catch-basins.—Catch-basins will be built as shown on drawings of eight-inch brick work, with stone cover properly cut and set, or of iron, as commissioners direct. Storm water inlets will be shown on drawings of ten-inch sewer pipe, with cast-iron ring and grating, not to weigh over 200 pounds. The price bid on catch-basins and inlets will include the furnishing, laying, excavating for and back-filling over, of the necessary ten-inch sewer pipe to connect them with the sewer, the length of which will be about thirty-three feet. Silt basins will be built complete as shown.

13. *Brick sewers.*—Brick sewers shall be built of the dimensions shown on the plans and in strict accordance with the detail drawings.

The contractor shall furnish all centers and templates for forming the sewers to the size and shapes required. No centers shall be struck till the work is thoroughly set, and then only on the written order of the engineer. The centers must be struck with great care so as not to crack or injure the sewer. After the centers are drawn the joints must be struck with neat Portland cement and the entire inside of the sewer coated with a thin wash

of pure Portland cement applied with a brush. All fresh work must be carefully protected from injury. No wheeling or walking on it must be allowed, and any portion injured must be relaid by the contractor without extra charge.

Vitrified drain pipes of the best quality, four inches in diameter one foot long exclusive of hub and closed with a galvanized iron cover and cement, must be set in proper localities for inlets and wherever the engineer may require. All mortar must be made of the best freshly-ground American hydraulic cement. When necessary, in the opinion of the engineeer, cement alone without a mixture of sand must be used.

Tile inverts.—The inverts of all brick sewers shall be of vitrified salt-glazed earthenware and of the form and dimensions shown on the drawings. The vitrified salt-glazed fire-brick used shall be of the first quality and uniform in size. They shall be carefully and evenly laid so as to form a close joint.

Stone covers.—Whenever a flat-topped form of sewer is used the cover shall be of stone slabs six inches in thickness, not less than three feet long on the line of the sewer and of the width shown on the drawings. The joints between the stone cover and the brick work and between the successive slabs shall be carefully formed and shall be pointed with pure cement.

Drain tile.—Drains of vitrified sewer pipe properly laid on a board and caulked with jute will be laid when directed. The price bid for drain tile shall include furnishing and laying the pipe. Sewer pipe for drains may be of second quality.

14. *Excavation of ditch.*—The ditch shall be excavated along the line designated by the engineer, and according to the depths given by him. The contractor shall notify said engineer when he desires a new street laid out and shall furnish him all the manual assistance he desires for this purpose, as well as stakes or spikes that may be required. The engineer shall limit the amount of street to be opened in advance of the work. Should the ditch be excavated below the required depth, the contractor shall fill the same to grade with suitable materials at his own expense. The engineer may order any ditch braced or sheeted that he may deem necessary, nor shall the contractor receive any extra pay for such bracing unless the same be left in the ditch by the order of the engineer. The contractor shall be responsible for any damages done to gas, water or sewer pipes that he may encounter in the

excavation. In back filling all ditches the earth must be properly rammed to the level of the surface of the ground. The price bid per lineal foot of excavation includes all excavation and back filling and all restoration of the surface of the street, resetting curbs, walks, etc. The width of the ditch at the bottom must be at least one foot greater than the diameter of the pipe.

15. *Rock.*—Rock will be paid for by the cubic yard. Only the quantity actually excavated will be paid for. Decomposed rock, that can easily be worked with the pick, will be classed as earth. Boulders containing more than (2) two cubic feet will be classed as rock. Earth above rock will be paid for at contract prices for actual depth of earth.

16. *Pipe laying.*—No pipe shall be laid except in the presence of the engineer or his authorized inspector. The contractor shall notify the engineer whenever he is ready to lay pipe in any particular ditch. The engineer shall have the power to order the removal and relaying of any pipe laid against his orders or during his absence from the work. All pipe must be laid in straight lines unless directed to the contrary by the engineer. The said engineer shall use such means as he deems proper for laying the pipe properly to the grade and the contractor shall provide him all manual labor, stakes or twine necessary for the purpose. The joints shall be made of a gasket of oakum caulked into the bell with clear cement pressed around the entire circumference by hand. The outside of the joint must be neatly beveled. The earth must be filled in halfway up the sides of the pipe, carefully tramped around and under. No pebbles larger than one and one-half inches in diameter shall be filled in during this part of the work. After the earth has been tramped around the pipe, it shall be filled in to a depth of two feet, after which the successive layers to the surface may be pounded or flooded as the engineer may desire.

17. *Disorderly workmen.*—The engineer shall have the right to order the discharge of any disorderly or incompetent person employed by the contractor.

18. *Restoration of streets.*—The contractor shall restore the surface of the street to as good condition as they were before being entered upon by him. The refilled earth must not be heaped more than six inches above the original surface and the

line of the ditch must be passable to traffic within three days after the pipe is laid. The contractor shall use all pains to preserve the original excavated surface, when the latter is a better material for road service than subsoil. All work of restoring surface of streets and replacing pavements, crosswalks and curbs shall be done to the satisfaction of the street committee of the board.

19. All streets must be cleaned up and placed in a neat and orderly condition before the work contained in that portion is included in any monthly estimate. All surplus earth and material must be cleaned away and any deficiency of material supplied by the contractor at his own cost that may become necessary to restore the street to its proper condition. All surplus earth after the trenches are properly filled and settled shall be deposited by the contractor, free of charge, on such portions of Minerva, Grove, Delaware, Simpson, William, Catherine or Hill streets, as the trustees shall direct.

20. *Removal of rubbish by board.*— Should the contractor leave any unnecessary rubbish, earth or material on the street during the progress of the work, the engineer shall notify him to remove same. Should the contractor fail to do so within three days the board may cause the same to be removed and the expense thereof shall be deducted from the retained ten per cent.

21. *Lights and watchmen.*— The contractor shall place any lights, guards or barricades that may become necessary to protect the public against accident. He shall also, should the board so direct, have a watchman on the work at night.

All bids must be made upon the blank furnished by the board of sewer commissioners. Each bid must be accompanied by a bond for the sum of ten thousand dollars ($10,000) as a guarantee that the bidder will enter into a contract with the board of sewer commissioners at any time within a period of ten days after the bids are opened. The date of entering into such contract is to be at the option of the board within the above limits. Within a period of one week after the bids are opened the board will announce the name of the bidder whose propositions they desire to accept, and the bonds of all others will be returned. Said announcement shall in no way bind the board to enter into contract with any party in case it may not be deemed expedient to perform the work of construction during the present year. No changes shall be made in the form of bids nor must any additional

modifications or any form of explanation be annexed. Such addition will measure the rejection of the bid. All bids must be full in every particular. The price bid for masonry includes the total cost of masonry, whether in water or in dry land.

OFFICE OF THE STATE BOARD OF HEALTH,
ALBANY, N. Y., *August* 31, 1889.

Approved in accordance with a resolution adopted by the State Board of Health, August 27, 1889.

LEWIS BALCH, M. D.,
Secretary and Executive Officer.

REPORT OF CHAS. C. BROWN, C. E.

UNION COLLEGE,
SCHENECTADY, N. Y., *August* 26, 1889.

LEWIS BALCH, M. D., *Secretary of State Board of Health, Albany, N. Y.:*

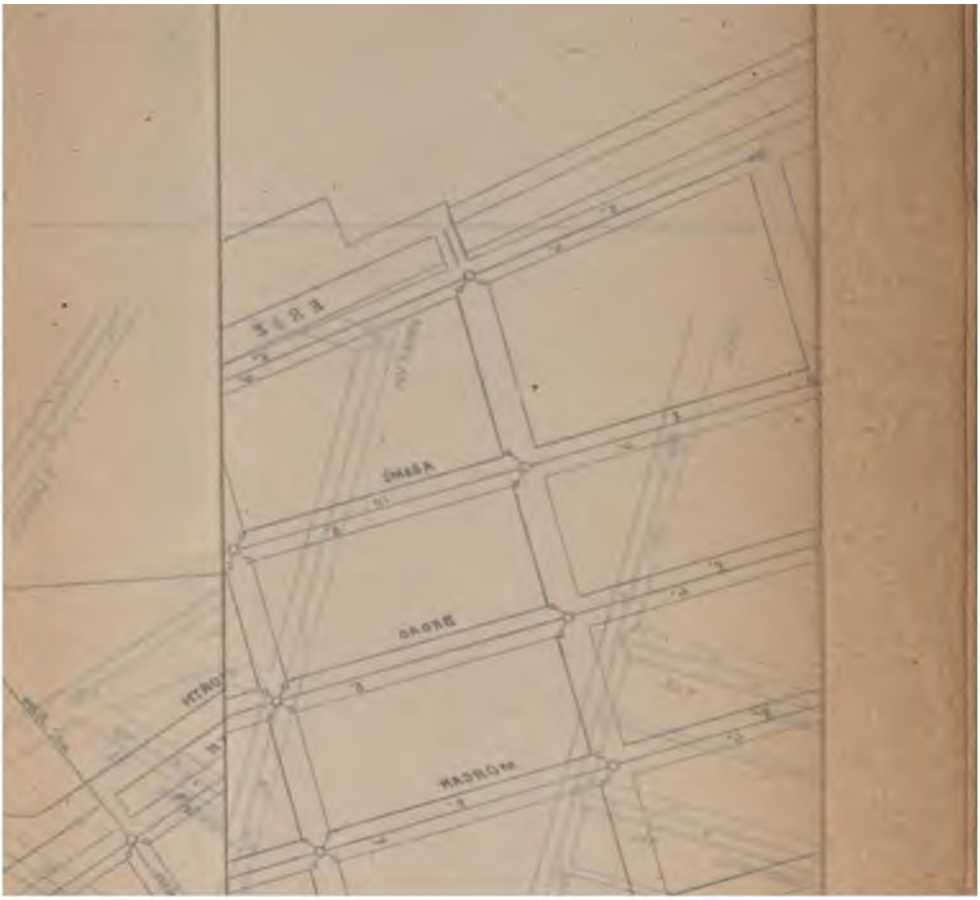
DEAR SIR.—I have examined the plans for the sewerage of Tonawanda, and have made an inspection of the village, and have the following report to make:

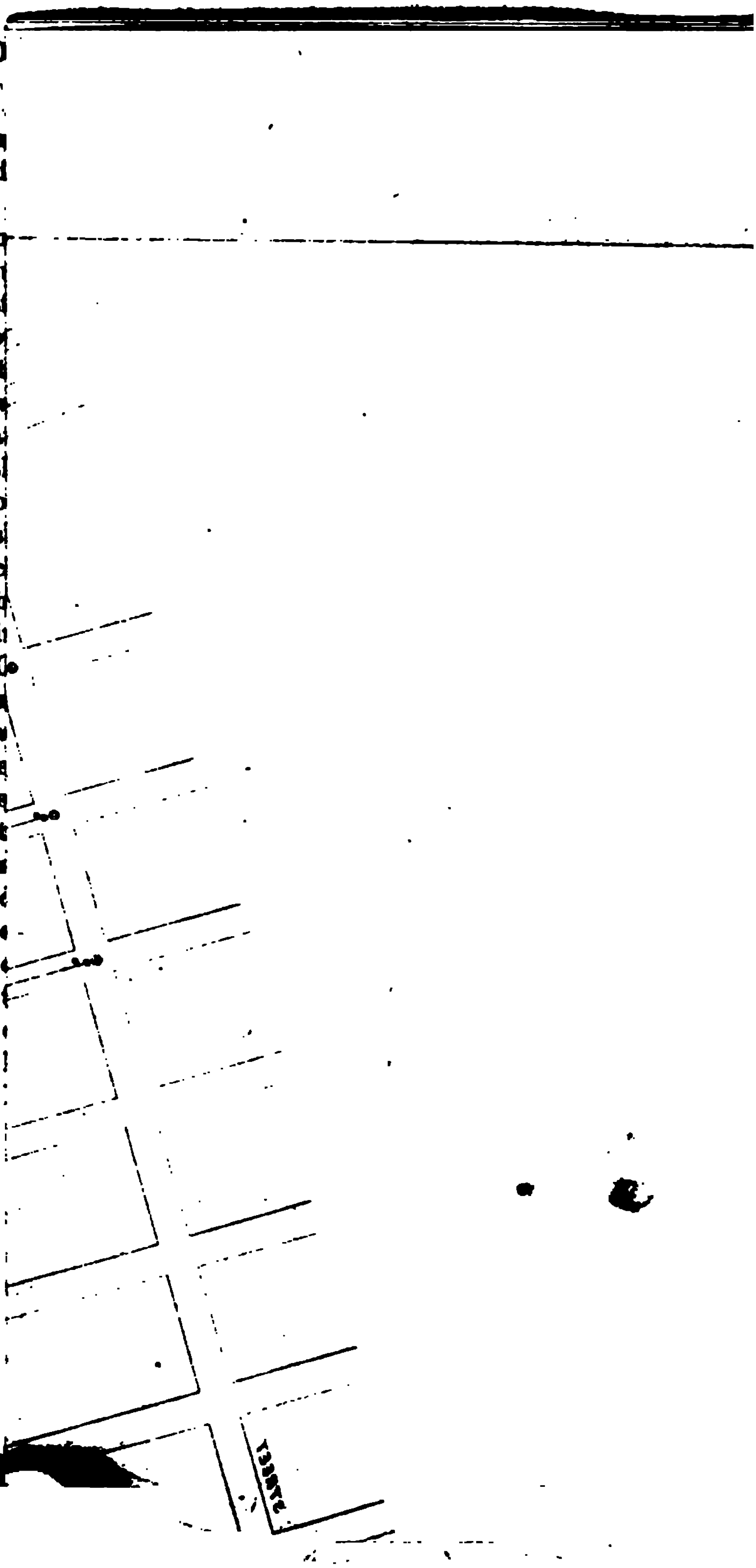
The problem is a difficult one to solve, owing to the presence of the Erie canal and its adjuncts. The village lies along the Niagara river just above the mouth of Tonawanda creek. The canal runs through the village from the north until it reaches the creek, at an elevation of a little more than four feet above the river. The creek is dammed at the entrance of the canal, and becomes a portion of the canal for some distance along its course. Just above the entrance of the canal, Ellicott creek enters Tonawanda creek from the northern side. Its level is also raised by the dam in Tonawanda creek. The ground level over a large territory is below this level, and the water of the creek is prevented from overflowing in ordinary seasons by raising the banks of the creek. To carry off the drainage of this district, two creeks have had their connection with Ellicott creek cut off and have been turned into the "State ditch," which runs through the village under the canal into Niagara river, as shown on the plan.

This ditch is not, and can scarcely in the nature of the case be made, large enough to carry off all the water coming to it in times of heavy and long-continued rain.

A large portion of the village is in the low ground above mentioned, or is barely above the level of the water in the dam, and is, consequently, subject to overflows. This condition of affairs, for which the construction of the Erie canal is responsible, puts the village in poor condition as regards drainage, and renders it necessary to use the sewers for carrying off surface water as well as sewage. The great extent of low ground makes the fall available very slight, unless the outlet is put below the level of the river and pumping is resorted to. The village is too small to be able to stand this expense, and the plan has been made with slight falls in these portions, giving nearly the limit of self-cleansing velocities for the sewage at its normal flow. Flush-tanks have been inserted to help in keeping the lines of pipe clear, and inlets from Ellicott creek to fill the sewers with clean water. Gates are arranged for to still further intensify the flushing action in the lower portion under special conditions. Even with these slight falls, the sewers, as will be seen by reference to the profiles, come to the surface on three or four streets, so that the streets must be graded up to cover them. This means that the lots must also be graded up and houses raised in order to enter the sewers with the house drains. A heavy expense is here involved in addition to the expense of the sewers, and so far as the sewers themselves are concerned, it might be well to estimate the comparative cost of this filling and of the pumping that would be necessary for a deeper location of the sewers, and to select the cheaper. But so long as the Erie canal remains, and this territory is not filled to a level somewhat above the canal, it will be subject to overflow, and this additional argument for the filling process is sufficient to justify the location of the sewers that has been made in the plan. The village would be justified in asking some assistance from the State in this matter, since the State canal is mainly responsible for the present condition. It is proposed to discharge the sewage into the Niagara river at three points, two of them at the depth necessary to carry pipes under the bed of the canal.

The Niagara river is a stream that is used for potable purposes, but so long as the city of Buffalo is permitted to discharge its





sewage into the river, it is useless to object to the comparatively small amount of additional pollution from the village of Tonawanda. Should sewage purification be required, it would be necessary to pump the sewage up from the level of the river, at which it will practically discharge, according to the plan. This contingency is, I think, very remote. The outlets are above the intake of the water-works of the village, but the city engineer informs me that experiments have shown that the currents will carry the sewage by the intake on the opposite side of the island in the river on which the water-works are situated.

The plans give a good solution of the problem, I think, and are very satisfactory in their details.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

WATER SUPPLIES.

HEMLOCK LAKE.

Report on Violation of Rules of State Board of Health to Conserve its Purity.

ALBANY, *June* 24, 1889.

To Dr. LEWIS BALCH, *Secretary State Board of Health, Albany, N.Y.:*

DEAR SIR.— The chief engineer of the water department of the city of Rochester having, on the twentieth of June, notified the State Board of Health of the violation by one, C. C. Campbell, of the town of Livonia, Livingston county, of Rule 12 of the regulations made for the sanitary protection of the waters of Hemlock lake, and requested action under section 4 of chapter 543 of the Laws of 1885, I was directed by you to proceed to Livonia and examine and report in regard to the facts.

On the twenty-first of June I proceeded to Rochester and the following morning was joined by Chief Engineer Tubbs, who accompanied me to Livonia station, whence we proceeded by team to the point on the lake where the alleged violation was said to have taken place.

I found it to consist of a cow stable, which evidently had also been used as a pig-sty. Six cows I was informed were kept there, but at the time of my visit they were away grazing in the field and the stable was empty. The inclosed sketch will show the location of the nuisance with reference to Hemlock lake.

The evidence of the occupancy of the stable was visible in the droppings in front, by the side and in the rear. At the rear of the stable is a small ravine passing and running with a more or less circuitous course into the lake. The rains would necessarily wash the cattle droppings from the rear and from one side of the shed into this ravine, through which they would be carried of

necessity into the lake. Besides this what would not be washed into the lake through the ravine, namely, the droppings in front of the stable, would naturally take a more direct course down the descending slope into the lake. Rule 12 was clearly violated by the location of the stable. This rule provides:

RULE XII.

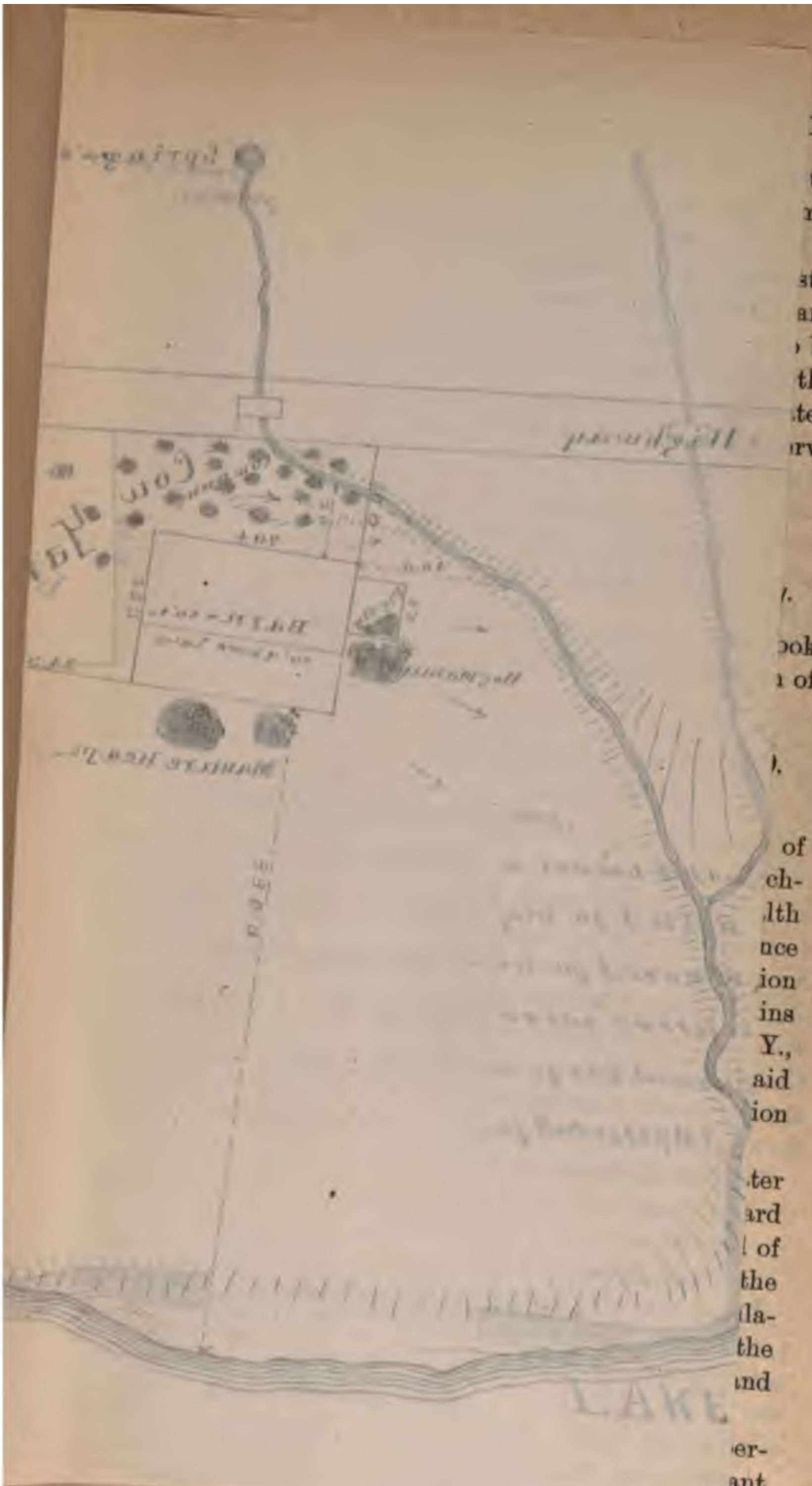
Section A.— No stable, pig-sty, hen-house, barn-yard, hog-yard, hitching or standing place for horses, or other place where animal manure accumulates, shall be so constructed or located that the manure from it may wash into the lake or into any stream, spring or dry water-course running into the lake.

Although the amount of pollution from this particular source might not be of serious import taken by itself, yet when it is considered that the toleration of one such violation of law forms a plea that might be used in extenuation of others, and that a number of such increments of defilement permitted to remain would unquestionably constitute a grave danger, prudence dictates that the rule of excluding all is wise and equitable and in fact the only sensible course.

I called at the house of Mr. Campbell to hear what he had to say, but found that both himself and wife were away from home, hence could not have an interview with him. I then got the board of health together, all being present with the exception of the supervisor who was at the time too far distant to be reached, and explained the situation. I informed the board that this man had clearly violated the rule and that I would so report to the State Board of Health on my return, that they might expect directions from the secretary requiring them in accordance with law to order the removal of the stable to comply with the rule above quoted and enforce such order. The board expressed its readiness to act without delay upon receiving proper directions from the State Board of Health.

This is the first case of violation of the board's rules to protect water supplies thus far reported, and in fact the rules to protect this water supply were the first framed by the State Board of Health. I found a general feeling among the people in favor of preserving the lake from pollution.

There appeared to be no adequate reason why any impurity should go into the lake from this source. The stable could have



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had a different location without injury to the owner. In fact the superintendent informed me that he was ready to aid Mr. Campbell in the removal so as to minimize the inconvenience.

I examined into the provisions made by the city of Rochester for the collection and disposal of the sewage, the cleansing and disinfection of the receptacles used, and found everything to be perfect of its kind. The place is a model of cleanliness and the lake itself a body of clear, pure water most picturesquely situated and well worthy the efforts of the city of Rochester to conserve for a water supply.

Very respectfully, your obedient servant.

FREDERICK CARMAN,
Assistant Secretary.

On the receipt of the above report the Secretary at once took action and forwarded a communication to the board of health of Livonia of which the following is a copy:

ALBANY, N. Y., *June* 24, 1889.

To the Board of Health of the town of Livonia, N. Y.:

GENTLEMEN.— On the twentieth of June the chief engineer of the water department of the executive board of the city of Rochester, Mr. J. Nelson Tubbs, notified the State Board of Health that Rule 12 of the rules and regulations made by it in accordance with chapter 543 of the Laws of 1885, for the sanitary protection of the waters of Hemlock Lake, had been violated by one Collins C. Campbell, of the town of Livonia, Livingston county, N. Y., and requested immediate action as directed by section 4 of said act, said Campbell having been formally notified of his violation of rule and positively declining to do anything in the matter.

Section 4 provides that when the officer in charge of the water supply of the municipality affected shall notify the State Board of Health of the violation of any of its rules, the State Board of Health shall thereupon examine into the said violation, and if the party complained of is found to have violated any of said regulations, the secretary of the State Board of Health shall order the local board of health, having jurisdiction thereof, to convene and enforce obedience to the said regulation.

Immediately on receipt of the notification from the superintendent of the water department, I dispatched the assistant

secretary to examine into the question of the alleged violation. Rule 12 reads as follows "No stable, pig-sty, hen-house, barnyard, hog-yard, hitching or standing place for horses or other place where animal manure accumulates shall be so constructed or located that the manure from it may wash into the lake or into any stream, spring, or dry water-course running into the lake."

The assistant secretary reported that he found a cow stable so located that the manure from it must necessarily be washed into the lake, mainly through the ravine in its rear and running in a circuitous route down into the lake itself. What does not get washed into this ravine and carried through it into the lake is carried by a more direct and shorter route straight into the lake itself, by reason of the steep slope from the stable to the margin of the water.

The rule being thus clearly violated, it is my duty, in accordance with section 4 of chapter 543 of the Laws of 1885, to direct you to immediately convene and enforce obedience to said regulation. To do this it will be necessary to have the stable removed, all the manure droppings cleaned up and a new location selected for the stable, if it is to be hereafter maintained, that will conform to the provisions of Rule 12 already referred to.

Your board of health should first formally order Mr. Campbell to comply with the provisions of Rule 12, and if he fails to do so immediately to engage men and have the stable removed. Any person daring to interfere with the orders of your board should be promptly arrested, and you have power to call upon the sheriff of the county for such assistance as you may need in the discharge of your work. Please report to this department the action you have taken. The penalty provided in the rules for violation thereof should be enforced against Mr. Campbell.

Very respectfully, your obedient servant.

LEWIS BALCH,
Secretary.

The State Board was informed subsequently by the chief engineer of the water department that the board of health of Livonia acted promptly in the matter, and the cow stable complained of was removed to a location which would not endanger the purity of the lake.

REPORT

ON

Pollution of Esopus Creek.

UNION COLLEGE,
SCHENECTADY, N. Y., *July* 1, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health:*

DEAR SIR.— I have the following report to make of my investigation of the proposed discharge of the sewage of a portion of the city of Kingston into Esopus creek and its effect upon the inhabitants of the village of Saugerties:

Under the plan for the complete sewerage system prepared by A. Grant Childs, city engineer, in 1884, upon general lines approved by Mr. James T. Gardiner, consulting engineer of the State Board of Health, it was proposed to discharge the sewage from the first drainage district into Esopus creek. This drainage district includes "the first and second wards, nearly all of the ninth, and a portion of the eighth ward." The following table, taken from the report by the city clerk, Mr. A. Schepmoes, of the enumeration of 1885, shows the population in the above-mentioned wards and the increase since the census of 1880. The increase in population of the entire city during that time is fifteen per cent.

WARD.	POPULATION.		Increase.
	1880.	1885.	
First	1,780	1,957	177
Second	1,590	1,791	201
Eighth	2,151	2,537	386
Ninth	2,633	3,031	398
Total in these wards	8,154	9,316	1,162
Total in city	18,342	21,104	2,762

The city clerk estimates that there should be deducted from the above amount of population in 1885, the following, whose sewerage is included in other drainage districts:

Half of eighth ward	1,269
Part of ninth ward	300
Total	1,569

This leaves 7,747 people in the first drainage district, "or in round numbers 8,000" at the present time.

The accompanying large map, furnished by the present city engineer, Mr. S. B. Sears, shows very closely the area of the first drainage district and the extent of the proposed sewerage system of that district. That portion of the district within the free-hand dotted line is unoccupied, and "the balance on the northerly side of Union avenue, or between Union avenue and Ten Broeck avenue, is very thinly settled." It will be seen that it is possible to have an appreciably greater population in the district than is now there.

It is proposed at this time to construct only that portion of the system of sewers in the First ward, including the outlet to the district. This territory would be included between lines drawn to connect the letters AAAAA, and is now, I believe, with the outlet under contract for construction. The population on this portion of the district, is as stated above, 1,957 or say 2,000.

The water of Esopus creek is used for potable purposes in one or two mills in the village of Saugerties. It is introduced by pipes. There are three taps from the village water-works in one mill (whose supply is obtained from another source) which employés can use if they wish. There are 900 employés in this mill. Thirty-two houses occupied by mill operatives are located on "the island" between the river and the main mill race. The rear ends of the lots on which these houses are situated are on the race, and this is their supply of water for all household purposes. The owners of the mill property are ready to put in connections with the village water-works for any of their tenants on the island who wish them, and who will pay the water rents, but so far they report that the tenants prefer to use the creek water. Ice is cut in considerable quantities from the mill pond to fill houses upon its banks, and in other places.

Mr. Sears and myself made some approximate estimate of the flow of water in Esopus creek at Kingston and at Saugerties, and in the tributaries of the creek, at and near the time of my visit. But I am able to give a definite statement of what is approximately the minimum flow of water in the stream, obtained in the following manner: The two mills using the water have six turbine wheels. The wheel manufacturer's statement of the amount of water necessary to run these six wheels is 12,721 cubic feet per minute. If we allow about 2,000 cubic feet per minute for waste and for water used in the washing processes and in other ways in the mill, this gives us 15,000 cubic feet per minute as the flow of water necessary to keep the mill running. It is the statement of Mr. Sheffield, of the company owning the water-power, that during about three weeks in winter, and about two months in summer, no water runs over the dam. He estimates that the above-given quantity of water should be reduced by twenty-five per cent during one summer month and by fifty per cent during another since it is during those times necessary to shut down more or less completely for from one-fourth to one-half the time to secure water enough to run during the remainder. The water used in the mill processes is filtered through an upward-acting gravel filter to remove mechanical impurities that would be injurious to the processes of the mill.

I could not learn that any one else habitually used the water of the creek for any potable or household purposes.

The city engineer of Kingston refers me to a paper by Mr. Rudolph Hering, civil engineer, before the American Public Health Association, for a statement of the conclusion that a flow of 150 to 200 cubic feet of water per minute in the stream for the sewage from each 1,000 people draining in the stream is a sufficient dilution to render the stream inoffensive, to preserve it fit for all ordinary manufacturing purposes, and to sustain the life of fish, provided that there is opportunity for a natural subsidence of the heavier matter immediately below the town discharging the sewage. The minimum flow on the minimum estimate above given will give a dilution for the sewage of the 2,000 people in the first ward nearly twenty times as great as that required by the larger figure in this statement; for the 8,000 people in the first drainage district nearly five times as great; and for the entire population likely to settle upon the district in many years, from two to three times as great.

The estimate of the proper amount of dilution above given is made on the supposition that the water is not in use for potable purposes. Should it be in use for such purposes, Mr. Hering very properly states that the amount of dilution must be indefinitely increased. There are no data upon which to base an estimate of the dilution then required, and the only absolutely safe course is to prohibit the entrance of unpurified sewage into the water.

There are two conflicting opinions as to the use of streams; one, that they are for use for any purpose for which they are fitted in their natural condition, and that any polluting matter from artificial sources must be purified before entrance into the stream sufficiently to preserve this natural condition practically unchanged at the points where the water is used; the other that they are the natural drainage channels of the country through which they pass and can be so used by the population along their banks with little or no reference to the other uses to which the stream may be put. A statement of the two views is sufficient to indicate which is the proper view to take in the greater number of cases. The latter view is ordinarily modified, however, to limit the amount of pollution allowable to such an extent that the stream can be used for almost any, except potable purposes without inconvenience, since it sometimes happens that the use of a stream for purposes of drainage is so much more important than for potable purposes that the value for the one greatly over balances the value for the other. The values for the two purposes are very nearly balanced in the case of Esopus creek, and in such cases it seems to me proper to consider the first view as the more nearly correct. This is the view that has been taken by the State Board of Health heretofore. Its acceptance in the present case would require the city of Kingston to purify its sewage before admitting it to Esopus creek, sufficiently to preserve the purity of the water at Saugerties, about twelve miles below, where it is first used for potable purposes.

The questions then arise as to what amount of sewage may be admitted at Kingston without affecting injuriously the purity of the water at Saugerties, and to what extent the purification must be carried for larger amounts of sewage. The opportunity for subsidence just below the city is ample, as the fall in the creek is quite low for some distance, to a point near the entrance of the

Saw Kill (see sketch of creek herewith), and the water flows slowly through deep pools. The amount of dilution at Saugerties is given above. Oxidation of impurities is greatly promoted by falls and dams of a combined height of 80 to 100 feet. The principal falls are shown in two of the accompanying photographs. Two other photographs show the larger part of the mill pond at Saugerties from which ice is cut and water is drawn for the mills and houses as already described, and which must be the final place of deposit of much sediment originally deposited in the pools near Kingston and afterwards washed out in times of flood to be deposited farther down the stream. Better opportunities for the purification of a stream by natural agencies before reaching the Saugerties mill pond could scarcely exist, and I think it will be admitted by any one not an alarmist that the admission of sewage from 2,000 people at Kingston will not injuriously affect the water at Saugerties under any conditions, except possibly an epidemic of such a disease as typhoid fever in the city. No one can say whether that fever would be communicated to the inhabitants of Saugerties through the water of the creek in this manner or not. As the sewage system is extended and as the population increases, the amount of pollution will increase, and the chances of purification before reaching Saugerties will decrease. No one can set an exact limit beyond which the amount of pollution shall not increase and purification processes shall be established. It would seem the safer course, therefore, to put in purification works at this time, or at least on any appreciable increase in the extent of the sewerage system. There is no doubt that the sewage of perhaps as many as 2,000 people now reaches the creek through storm water-sewers, private drains and the like.

The sewer map and the profile of the outlet accompanying indicate the character of the flat along the creek. The streams in this region are subject to sudden and great floods, and the entire flat up nearly to the line of buildings on Front street is subject to overflow. It would hardly be possible to provide any system of purification by intermittent filtration or irrigation on this account,—without pumping. A chemical plant could be operated quite close to Front street without pumping, but I think it probable that a large part of the fall through the works would be lost at times of high floods for the hours during which they last.

The dilution at such times is so enormous, and the amount of water retained behind dams and in deep reaches is so small in proportion to the total amount, that the pollution from the raw sewage during these times need not be feared in the least. It would be necessary to exercise extreme caution in working the plant to prevent odors arising from the works, owing to their proximity to the houses of the city. It is possible, I think, to obtain this result. One of the accompanying photographs shows a possible location of the plant.

Respectfully submitted.

CHAS. C. BROWN,
Civil Engineer.

SECOND REPORT ON KINGSTON SEWERAGE INTO ESOPUS CREEK.

UNION COLLEGE,
SCHENECTADY, N. Y., *September* 17, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health:*

DEAR SIR.— At your request I have again examined the city of Kingston and Esopus creek with reference to the pollution of the waters of that stream by the sewage of the city. I extended the inspection of the creek to Saugerties down stream and to the uppermost villages up the stream and its tributaries, omitting only the hamlet of Hurley, which it was not convenient to visit at that time. I have also inspected Rondout creek and have obtained a general idea of the amount of pollution from villages and factories entering its principal tributary, the Wallkill. These inspections of creeks were in the line of my general inspection of the Hudson river and its tributaries, but are of use in the present case. I give here only the general results of these inspections, and would refer you to my report on the Hudson river work for the details.

The villages and hamlets on Esopus creek and its tributaries are most of them on the line of the Ulster and Delaware railroad and the Stony Clove and Catskill Mountain railroad. They are Brodhead, Shokan, Boiceville, Mount Pleasant, Phoenicia, Shandaken, Big Indian, Pine Hill, Chichesters, Lanesville. Others on the creeks or tributaries are Hurley, Marbletown, Woodland, Long Year. Others on the watershed at some distance from the

creek are West Hurley, Oliver, Brown's Station, West Shokan. The population of all these is about 2,600, perhaps one-third of this population being at a distance greater than 2,000 feet from the creek or its principal tributaries. By actual count there are above Brodhead's bridge 224 houses, hotels, mills and stores, 163 barns, seventy-eight privies, five pig-pens, one tannery, one slaughter-house, on the banks of the creek and its tributaries, or sufficiently near thereto so that a portion of the drainage from them enters the streams at times of rain. The numbers between Brodhead's bridge and Kingston are certainly small. The district is very thinly settled, there being almost no population except along the valleys of the creek, and this population being much scattered the largest village having less than 500 inhabitants. Near the headwaters are a large number of summer hotels and boarding-houses. As compared with the Croton watershed the pollution from all these sources is very slight. The creek is perhaps forty miles long above Kingston and its longest tributary less than fifteen. It drains about 450 square miles of mountainous country.

I also collected, or caused to be collected, four samples of the water, as follows: No. 1 at a point near the west bank of Esopus creek, 300 or 400 feet below the bridge at the upper end of Kingston, where pollution of the water from the city was very unlikely. No. 2 at a point on the east bank of Esopus creek, 300 or 400 feet below the outlet of Tannery brook, and the outlet of the system of sewers now in process of construction. The creek has at this point received whatever pollution it can from the surface drainage of the city into Tannery brook, being the drainage from houses, yards and outbuildings, and from such storm-water sewers as discharge street drainage more or less directly into the brook. There are several of these storm-water sewers which are said to have no house connections. The drainage from the Clinton hotel and several buildings is quite directly into this brook. When the system of sewers now under contract and in process of construction is completed and house connections are made, the sewage of 2,000 people will be discharged at the mouth of Tannery brook. No. 3 was taken at Stony Point at the entrance of the creek into the mill-pond at Saugerties about one-half mile above the dam, after Esopus creek has flowed from Kingston, nearly twelve miles, through pools and over rapids a total vertical fall of 80 to 100 feet. The creek has received in

this distance practically no additional pollution, and has received two tributaries of some size and several small brooks. No. 4 was taken in the same pond just above the dam and near the west bank after the creek has flowed through the pond and has received whatever pollution is added above the dam by the village of Saugerties. This pollution is represented by the drainage from about twenty houses near the bank of the pond whose privies are fifty feet or less from the water's edge, nearly half being much less; from twelve to fifteen houses on a small branch, whose privies are generally on or quite near the stream; and from Bridge and Partition streets surface drains which bring the storm waters from those streets and from side streets running into them.

The samples were taken after a rain and probably would show more evidence of sewage contamination than would be shown after long continued rains or during times of no rain. This is inferred from the conditions of Croton water under similar circumstances. (See my paper on Sanitary Condition of Water Supply of New York city, Jour. Asso. Eng. Soc., July, 1889.) Analyses of these four samples were made by Dr. Willis G. Tucker and his report thereon is as follows:

"STATE BOARD OF HEALTH OF NEW YORK:

"BUREAU OF CHEMICAL ANALYSIS,
"CHEMICAL LABORATORY, ALBANY MEDICAL COLLEGE,
"ALBANY, N. Y., *September* 12, 1889.

"Dr. LEWIS BALCH, *Secretary State Board of Health, Albany.*

"SIR.— On the tenth instant I received from you four samples of water for analysis. Two were contained in glass demijohns, and were marked 'No. 1' and 'No. 2' 'from Charles C. Brown.' They were shipped from Kingston, N. Y. The other two were contained in stone jugs and were marked 'Water from Esopus creek at Saugerties' 'No. 3' and 'No. 4.' They were shipped from Saugerties, N. Y. The analysis of the waters was begun at once and has just been completed. The results in tabular form are appended. It will be observed that the waters resemble each other quite closely in most respects, but there are some striking differences which I am unable to explain, knowing nothing of the localities from which the samples were taken nor the circumstances under which they were collected.

"The color, appearance and odor of these waters is good. Chlorine is low in all. Oxygen absorbed from permanganate also low for surface waters. Free ammonia quite low except in No. 3 in which it is excessive. Albuminoid ammonia is highest in No. 1, but fairly low in all. Total solids low in all, and behavior during ignition satisfactory. With the exception of No. 3, in which the free ammonia is in excess, these waters may be considered fairly satisfactory. No. 4 shows the least evidence of pollution, and the next best in most respects is No. 1. No. 2 contains decided traces of nitrites, and in No. 3 the free ammonia is in excess as stated. The albuminoid ammonia is not as high, however, as in No. 1. The water doubtless all contains some sewage, but it is largely diluted.

"Yours respectfully.

"WILLIS G. TUCKER,

"*Analyst State Board of Health.*"

BUREAU OF CHEMICAL ANALYSIS.

Parts per 100,000.

	No. 1.	No. 2.	No. 3.	No. 4.
Color and appearance	*	*	*	*
Odor at 100° F.	None.	None.	None.	None.
Chlorine	0.20	0.30	0.28	0.24
Free ammonia	0.0028	0.0033	0.0084	0.0026
Albuminoid ammonia	0.0107	0.0083	0.0080	0.0067
Nitrites	None.	Present.	Trace.	Trace.
Oxygen absorbed (Kabel)	0.1850	0.2000	0.1650	0.1500
Total solids	4.20	4.30	3.80	4.40
Appearance of residue	†	†	†	†
Loss on ignition	1.60	1.50	1.10	1.60
Phenomena during ignition	‡	‡	‡	‡
Mineral matter	2.60	2.80	2.70	2.80

The following I quote from my former report upon this subject: "There are two conflicting opinions as to the use of streams; one, that they are for use for any purpose for which they are fitted in their natural condition, and that any polluting matter from arti-

* Transparent, light greenish tint. † Almost colorless. ‡ Slight darkening, little odor.

ficial sources must be purified before entrance into the stream sufficiently to preserve this natural condition unchanged at the points where the water is used; the other, that they are the natural drainage channels of the country through which they pass and can be so used by the population along their banks with little or no reference to the other uses to which the stream may be put. A statement of the two views is sufficient to indicate which is the proper view to take in the greater number of cases. The latter view is ordinarily modified, however, to limit the amount of pollution allowable, to such an extent that the stream can be used for almost any except potable purposes without inconvenience, since it sometimes happens that the use of a stream for purposes of drainage is so much more important than that for potable purposes that the value for the one greatly overbalances the other."

Professor Tucker's report shows that the water of Esopus creek is now a fit source for potable water supply, and the inspection of the creek shows that but little labor will be necessary to remove practically all of the small amount of sewage pollution now entering the stream. A closer study of Kingston shows that nearly, if not quite all the sewage of the city can be disposed of otherwise than into this creek without unreasonable expense. In view of these facts I wish to modify my statement in the previous report and to say that the value of Esopus creek as a source of water supply so greatly overbalances its value as an outlet for sewage that, unquestionably, the purity of the water should be maintained. To maintain it, the sewage of the city of Kingston should be kept out of the stream so far as possible, and any sewage discharged into the stream must be purified to the greatest extent possible.

Kingston has an outlet at a reasonable expense for all or nearly all its sewage into Rondout creek. To determine the conditions under which this creek should be used as an outlet, I present the results of an inspection of the creek and of its principal tributary, the Wallkill. This inspection was not so detailed as that of Esopus creek nor is the inspection yet completed. What work has been done shows that a much smaller proportion of the houses and other buildings are close to the water than on Esopus creek. This is without doubt due to the fact that the valleys of these streams are much wider and more fertile than that of Esopus creek, the banks are much less steep and the available building

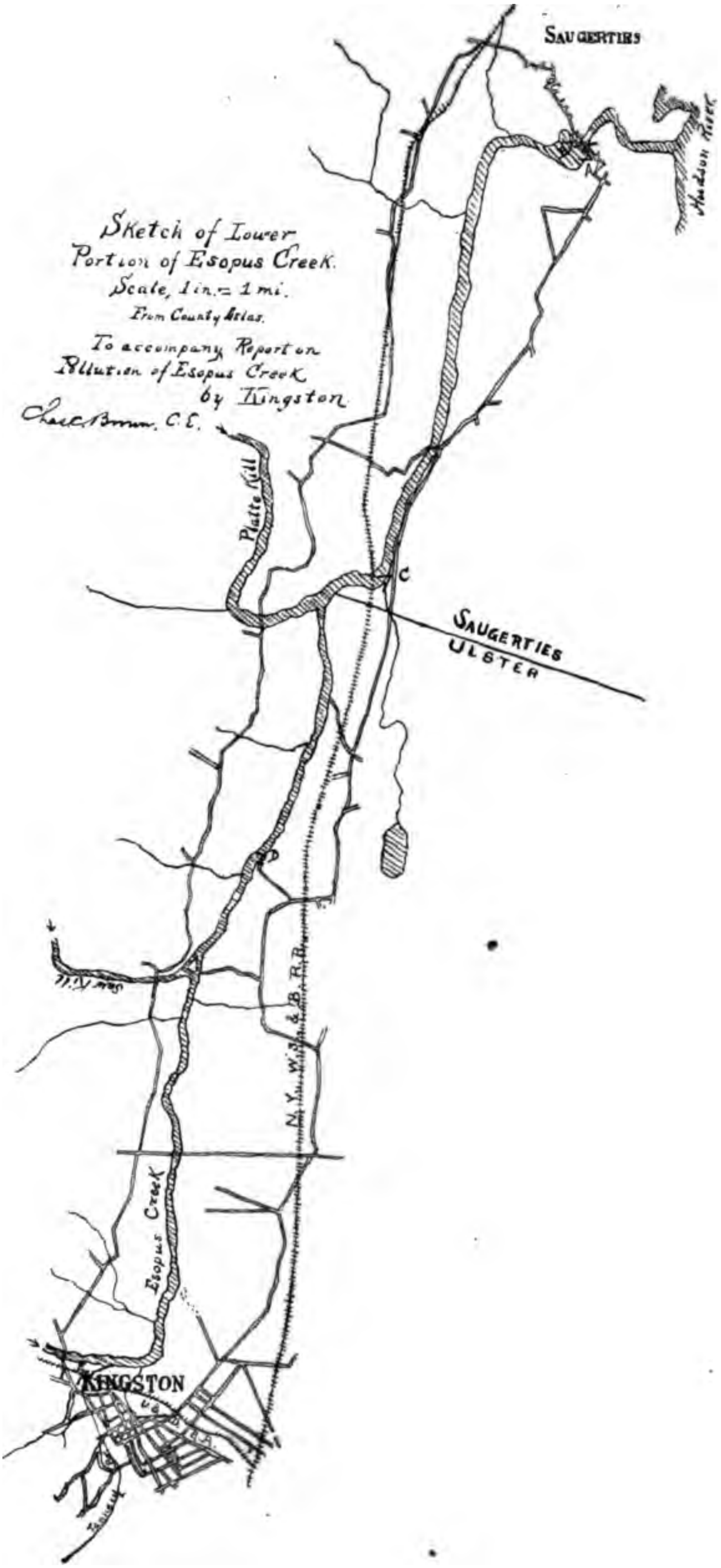
space practically unlimited and more eligible at some distance from the water's edge. Rondout creek is about fifty miles long and drains about 450 square miles of country, mountainous but somewhat less so than that drained by Esopus creek. The Wallkill is about seventy miles long and drains over 1,200 square miles of hilly country, some portions being mountainous. There is one city of 8,000 or 9,000 population and there are several large villages of 1,000 to 2,800 population on the water-shed, most of them being at distances of a mile or more from the main streams, on or near small brooks. One of these, Middletown, discharges its sewage raw into a small brook which finds its way into the Wallkill. Aside from this the pollution from sewage appears to be much less in proportion to the area of water-shed population and amount of water than on any other water-shed with which I am acquainted. And while the population in villages and cities on the water-shed of the Wallkill and Rondout creek is perhaps 35,000, the amount of water is increased in greater proportion and the amount of sewage pollution per mile is decreased. A chemical analysis of the water of the creek above Eddyville, will, I believe, verify this statement. Below Eddyville the stream is at the level of the Hudson river, and is subject to the tides and the consequent checking or reversal of its current. This stream is therefore not a fit receptacle for large amounts of raw sewage, whose retention during the periodic stoppage or reversal of current, as well as by the great number of boats congregating along the Rondout shore, will give rise to nuisance. The creek is also used to a certain extent for ice. Moreover, the Hudson river is used as a water supply below Kingston at two places, and may be in future at others. My inspection of the Hudson this summer, and my investigations of the character of the water supplies from the river so far as carried up to this time, show that it will be necessary to prevent the introduction of more raw sewage into the stream to enable its use to be continued, and that it is quite necessary to improve the condition of the water above its present quality to render it at all times perfectly wholesome. Therefore it will be advisable on both grounds to purify the sewage of Kingston before permitting its discharge into Rondout creek. It has been suggested that the creek could not be rendered worse than it is at present where the sewage is proposed to enter, but I can not agree with this view. The pollution at present introduced

is (with the exception of some of Kingston's sewage), almost entirely in the form of coal dust, slate, etc., from the operations on the great terminal plant of the Delaware and Hudson Canal Company, and, while in great part organic matter, is not of a decomposable nature, gives rise to no odor and does not injure the quality of the water for potable purposes for any distance below the mouth of the creek, *i. e.*, after it has had an opportunity to settle. Purification of the sewage is therefore advisable at any outlet.

It is believed that no system of sewage purification is sure to destroy all disease germs that may enter the disposal works with the sewage. It is the belief, founded upon observation, that a large dilution scatters the disease germs to such an extent that the chances of infection from them are reduced to infinitesimal quantities. It is quite necessary therefore that there should be as large a dilution as possible of the effluent from the sewage disposal works, or, in other words, the discharge into Esopus creek from the disposal works should be as small as possible. The discharge into Rondout creek will be sufficiently diluted by the volume of water in the Hudson river before it reaches the location of any water supply. It follows that the extent of the sewerage system tributary to Esopus creek should be the smallest possible, preferably not more than over the first ward, now under contract, and such small portions on Tannery brook and on the upper side of it as can not be conveniently turned the other way. It is possible to turn the main sewer of the first drainage district, carrying practically all the sewage from that district except that from the portion now constructing, down Jacob's valley, whose head it crosses, and thence to Rondout creek. This, with the other outlets constructed or proposed, would make four outlets in Rondout creek, and would necessitate a collecting sewer or several purification plants, where purification is resorted to, and some other route may be found more economical. Then, too, it may be found cheaper to pump the sewage now proposed to be discharged into Esopus creek over the divide to the disposal works established for the Rondout creek districts, than to establish a separate purification plant for it.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.


Sketch of Lower
Portion of Esopus Creek.
Scale, 1 in. = 1 mi.
From County Atlas.
To accompany Report on
Pollution of Esopus Creek
by Kingston
Chas. C. Brown, C.E.
SAUGERTIES
Hudson River
Platte Kill
C
SAUGERTIES
ULSTER
D
N. Y. W. S. & B. R.R.
Esopus Creek
KINGSTON

GENERAL SANITARY INVESTIGATIONS.

REPORT

ON

Sewerage for the Village of Goshen.

By Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *May* 22, 1889.

Lewis Balch, M. D., *Secretary State Board of Health:*

Dear Sir.—I have made the following report to the board of trustees of the village of Goshen, regarding the sewerage of that village:

On your request, through Dr. Lewis Balch, Secretary of State Board of Health, I visited your village on April twenty-seven, and again on May eighteen, for the purpose of preparing an opinion as to the desirability of a system of sewers for the place, and as to the character of that system, with some estimate of its probable cost.

I find the village to be delightfully located in a depression among the hills, at an elevation of 420 to 500 feet or more above the sea level, and fifty to 150 feet above Wallkill river, which the drainage of the village reaches through a small brook, with branches in the village, after a flow of about two miles. This brook at present receives much drainage from houses and business blocks in the village and nearly all of the street drainage. It has but little fall in the village, but has an abundance of fall for a short distance below. As it receives a large amount of surface drainage in times of rain, it is quite thoroughly washed out at such times, and so is in better condition during wet seasons than many similar streams in other villages. But the headwaters of one branch of the stream furnish the water supply for the village, and what is left forms only a small brook, which must become very foul during ordinary seasons when there are not fre-

quent heavy showers to flush it out. On my last visit I found the brook in this foul condition throughout both its main branches in the village. The brook is arched over and built over in the central part of the village, and one or more sewers from houses and business blocks enter it in this portion. I have no doubt that the condition of this brook is responsible to a large extent for the epidemics of zymotic diseases to which the village seems to be subject. It seems to me to be a necessity to improve the condition of this creek.

The first proposition that is made in such cases as this is usually to cover such a creek and turn it into a sewer, which shall carry off both house and street drainage, and into which all branch sewers from other streets shall empty. There are several objections to such a procedure. First, the nuisance now complained of will simply be transferred to a lower point on the stream, unless such a sewer is continued until it can discharge into a stream of large size. Second, the construction of a conduit in the bed of a stream, of suitable strength and tightness and of the size necessary to carry all the flood waters, is quite difficult and very expensive. It is the experience of nearly all places that have tried this method, that it is extremely difficult to obtain a satisfactory result from such a construction, and that it is unnecessarily expensive. Third, a sewer large enough for the flood discharge is much too large for the every-day flow of water and sewage in the stream; deposits, checking the flow of the stream, are bound to occur, and decomposition of the organic matter sets free gases of noxious character and obnoxious odor in such amounts that it is impossible to ventilate the sewers sufficiently to keep them in proper condition. The large sewer thus becomes a reservoir for dangerous gases, which avail themselves of every opportunity to enter houses and areas unprotected by traps. It is in almost every case the conclusion, as in this, that the house drainage should be kept out of the stream, and only the flood-waters from the streets and unimproved land allowed to enter it. The stream should be so protected by covering and artificial banks, that, with the aid of rules strictly enforced, all organic wastes, except such as can not be kept out of the washings from the streets, shall be kept out of the stream.

The village is of such a character and so well located that it is necessary to discuss but one method of disposing of the house-

wastes—that of water-carriage or sewerage. Since the flood-waters can be so well taken care of by the stream, it will be necessary to construct such a system only for the house wastes, such waters from roofs and areas only being admitted as can not be disposed of otherwise without great difficulty or risk of damage. As stated before, the village is exceptionally well fitted by nature for such a system and I have made an estimate for the construction of such a system. There is no doubt that such a "separate" system with its small pipes is much cheaper than one large enough to carry the flood-waters.

The next question to arise is as to the disposal of the discharge from the system of sewers. It is evident that if admitted into the brook at any point it will produce a nuisance at and below that point. This can therefore not be done. It might be possible to extend the outlet pipe to the Wallkill river and discharge the sewage there. This plan has two objections; first, the cost of the extension of the outlet sewer, which may be considerable as there is a long stretch of flat land on the way to the river, most of the fall for this outlet extension of about one and three-fourths miles being concentrated in a short distance near the river; second, the sewage will pollute the Wallkill river to a certain extent, only less than that of the pollution of the brook, because the river is larger, so that the village may be enjoined from discharging its sewage into the river. I think that the State Board of Health would probably not approve a system which discharged unpurified sewage into the river. Should the sewage be purified at the sewer outlet, it could then be turned into the brook without danger of creating a nuisance. There are several methods of purifying the sewage; by irrigating crops with it, by filtering it through prepared beds of natural or artificial soil, by subsoil irrigation, by chemicals, or by two of these methods combined. It would be possible to apply any of these methods if the outlet sewer is carried to a point just outside the village limits on the west near the crossings of the brook by the railroad. Both of those first mentioned require a great deal of attention and are seldom carried on in such a manner as to be free from odors; the third, subsoil irrigation, so far as my observation goes, does not give satisfaction unless the amount of sewage is small. The last, by chemicals, has in general given the best results in cases similar to this one,

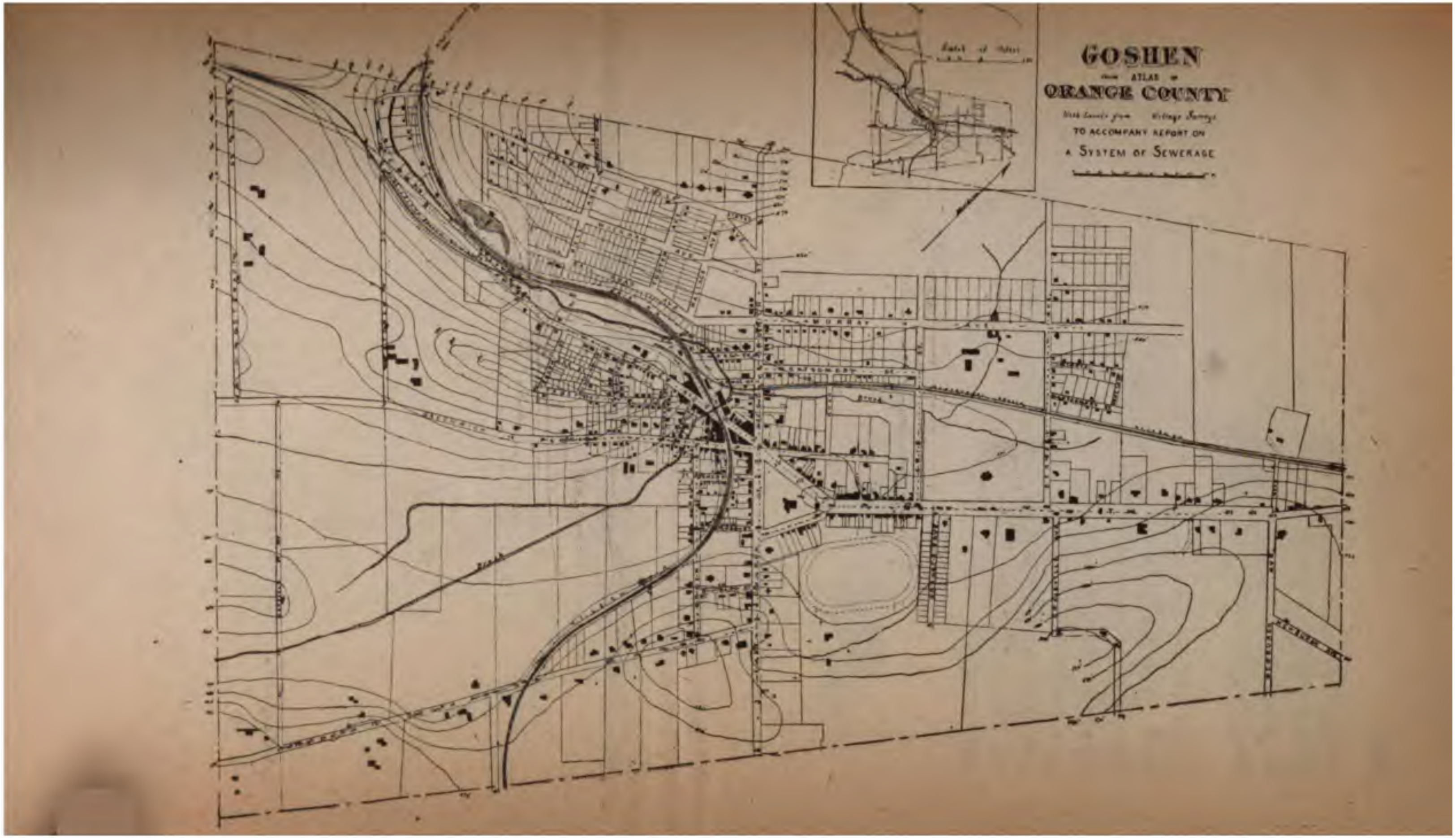
and is usually the most economical method. It requires less attention than the other methods, is more certain in its action, is less liable to give rise to nuisance from odors about the works. In general, the system consists in adding to the sewage certain chemicals, which have the effect, some of precipitating the organic matters in suspension in the sewage, others to a certain extent those in solution, and others which act as disinfectants or germicides. Different modifications of the system use different combinations of chemicals. The quantity and character of the chemicals to be used is regulated by the quantity and condition of the sewage and the degree of purity desired in the effluent. I think it is possible to produce an effluent sufficiently pure to be admitted into any stream not used directly for potable purposes by human beings. The works required are a series of settling tanks in which the sewage receives the chemicals and stands for a time to allow precipitation of the solids, and the apparatus for mixing and applying the chemicals. The tanks should be in duplicate to allow continuous action upon the sewage. The mass of precipitated solids or "sludge" is removed at intervals from the tanks. There are several methods of doing this, from compressing it into cakes from which as much water is squeezed as is possible, to simply dredging it out and carrying it away. It has some value as a manure, and if disposed of for that purpose should be dried or mixed with absorbent material sufficiently to make it of the proper consistency to apply profitably to the land. I have estimated the cost of works of sufficient size to take all the sewage likely to ever come from the village at $6,000. This includes proper buildings to inclose the requisite tanks and chemical apparatus. The maximum estimate of the cost of attendance and of chemicals necessary to produce the purest effluent possible is three dollars to five dollars a day. This can be reduced in the present case by reducing the amount of chemicals used, and by omitting part of the charge for labor if, as is recommended below, a sewer and plumbing inspector is appointed, and the care of the apparatus is added to his duties. If, as is suggested by one of your citizens, it is possible to dispose of the sludge as fertilizer, the expense of maintenance can be still further diminished. Should it be possible for the sewage to be discharged into Wallkill river without complaint, the additional length of outlet sewer would cost twice the first cost of the purification

apparatus. The interest on this excess of cost should be counted in as helping to pay the expenses of maintenance of the purification works. Should complaint of Wallkill river be made at any time, it would be necessary to insert the purification works after this outlet had been built, thus practically throwing away the cost of the long outlet. I have in mind one village which will shortly be in just this condition, after more than one extension of its outlet.

The following is a description of the general plan on which the estimate of cost has been made. Detailed surveys of some portions will be necessary to determine the exact location, sizes and cost of the lines of pipe. They should, however, follow as nearly as possible the lines of this general plan. The main outlet will be a line of fifteen-inch vitrified sewer pipe from the location of the sewage purification works, near the western limit of the village and the Erie railroad, to a point near the crossing of West Main street and the railroad. This line can follow West Main street for much of the way, or, perhaps better, the railroad. There may be three main branches to this outlet sewer, of twelve-inch pipe; one up Canal, Montgomery and Erie streets to Main street; one up West Main street to Church street; and one up John and Greenwich streets to Green street. Smaller branches of ten and eight-inch pipe may be laid in Prospect, William, Sayer and West Main streets; Prospect, High, New and Greenwich streets; in South, Green, Cross and James streets; in South, Church, East Main and Main streets; in West Main street; along the railroad opposite the depot; in West street; in West Church street; in Greenwich street; in Murray avenue, along the back line of lots between Murray avenue and Montgomery street and West church street; in Murray and Berdell avenues, Middle and Montgomery streets and along the Montgomery railroad; in Main street, west of Erie street; in Main street, east of Erie street; on lines approximating as closely as may be to the dotted lines laid down on the map. This system would thoroughly sewer all parts of the village, which can be considered as directly benefited by sewers to an extent at all commensurate with the cost of the system necessary to reach them, and would probably be sufficient for the needs of the village for many years to come. There are nearly 25,000 feet of pipe in this system, and the cost of the system down to the purification

apparatus may be liberally estimated, on the supposition that there will be but little rock excavation, at $36,000. A proper purification apparatus would cost about $6,000, making the total first cost of the system $42,000. Should it not be deemed advisable to construct the entire system at once, the following portions may be omitted: Church street, east of South street; Main street, east of Erie street; Murray and Berdell avenues, Montgomery and Middle streets and the Montgomery railroad; back of Murray avenue lots, and Murray avenue; along the railroad opposite the depot; a portion of Greenwich street; South street and Division street. These omissions would still leave a system of sufficient extent for the absolute needs of the village for some years, and would reduce the cost about $11,000, making the total cost $31,000. The omissions would not probably need to be supplied for several years. It is easy to select other omissions to the amount of $5,000 or $6,000, which would reduce the system to the absolute needs of to-day, making the cost of a system only just sufficient at the present time, about $25,000 or $26,000. The second series of omissions and many of the first set would probably be supplied from choice within a very few years after the first system is put in. I am a strong advocate for the entire system, or at the least the second system mentioned, believing that any reduction from that amount will be working too close to the absolute present necessities of the case, and that it will be more economical to put in all that will probably be needed for a number of years at one time, than to let it in smaller sections at different times under care of various persons.

The intention in making the estimate has been to provide for a system with first-class materials and workmanship, placed sufficiently deep to be able to drain all buildings to the lowest cellar, with sufficient fall in the house connections to reduce the number of stoppages to a minimum. It includes a proper supply of flush-tanks, man-holes and lamp-holes for thorough inspection, and cleaning of the pipes of the system. The prices used allow for some rock excavation, and compare closely with those in villages which are as nearly as may be under the same conditions of soil and slope as Goshen, and are believed to be ample to cover the entire expense, and still not so large as to leave a large surplus after the work is done. Should a large amount of rock be found, there will be no surplus. A competent


GOSHEN
FROM ATLAS OF
ORANGE COUNTY
TO ACCOMPANY REPORT ON
A SYSTEM OF SEWERAGE

engineer should be employed to make what detailed surveys are necessary, and to prepare plans and specifications under which the sewers shall be constructed. Competent superintendence of the construction should be secured, that the good work required by the specifications may be certainly obtained.

A good system of sewers often has its usefulness very much curtailed by poor connections, and poor house plumbing. It is within the province of the village authorities to require good work in both these regards, and it can not be insisted upon too strongly that a man of sufficient knowledge and judgment be employed to thoroughly inspect, and accept or reject all work in plumbing and sewer connection, such work to be done under rules laid down by the village authority. This man can also have charge of the sewage disposal works.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

REPORT

ON

Sewerage for the Village of Greenport.

UNION COLLEGE,
SCHENECTADY, N. Y., *August* 31, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.:*

DEAR SIR. — I have the following report to make of my visit to Greenport, Long Island, on August twenty-six.

I find the village to be quite compactly built on the shores of the bay at the eastern end of Long Island, upon a sand and gravel subsoil, and with slight elevations and very gentle slopes. The village has somewhat less than 2,500 inhabitants, but gives indications of a slow increase in population. It is at the end of one line of the Long Island railroad, has a harbor, and does considerable business in oysters, etc.

The soil as stated is very porous and is underlaid at no great depth with clay. Wells are not often more than fourteen feet deep, it is said. In the village the wells are quite close to the houses and to the cess-pools. I have no doubt that the leachings of many cess-pools find themselves shortly in wells, with only such purification as comes from the coarse filter. Cases of typhoid fever, which occur in certain neighborhoods, justify this belief. I believe it to be only a question of time and opportunity to give the village an epidemic of this disease. Heretofore the village has depended upon wells for its water supply, but a system of water-works has just been completed. As connections are made with this system the amount of polluted water to be disposed of will be increased, and the condition of the subsoil will deteriorate even more rapidly, rendering use of wells by those not connecting with the water-works even more dangerous. It is the experience of almost all villages that the introduction of water-

works necessitates, at an earlier or later day, the introduction of a sewerage system to carry off the water after its pollution by household use. Greenport needed sewers before water-works, so far as contamination of its water supply was concerned, but sewers can not be run without water, so that they could not be constructed until the water was supplied in sufficient quantities.

There is but little difficulty in grading the streets so that the entire surface drainage can reach the harbor easily and harmlessly, so that there is no necessity of going to the expense of a "combined" system of sewers. A "separate" system taking only sewage and excluding surface drainage is amply sufficient for the needs of the village. The grades will be low in the sewers, but will be quite sufficient to render the sewers self-cleansing, with the assistance of flush tanks at the upper end of all lines. Outlets can be found into the harbor at the ends of the streets running parallel to Main street, and of short lines at the ends of other streets, so that there will be no necessity for lines of large pipe. Eight, ten and twelve-inch vitrified sewer pipe may be needed, but much the greater portion will be eight-inch. Possibly no twelve-inch pipe will be necessary. No sewer outlets should be located on the "creek" above the dock at the end of Central avenue, as the tidal scour is not sufficient here to insure prompt removal of sewage. All parts of the village except the swamp at Third avenue can be easily reached by the system. This swamp must be filled to render it inhabitable, and can be filled to a reasonable grade of the sewers with reasonable expense. From four to four and one-half miles of sewers will probably be required. In consideration of the small sizes of pipe required and of the absence of rock or other difficult material to excavate, I should estimate the entire cost of the system at $5,000 a mile, this to include pipe and laying, man-holes, lamp-holes, flush-tanks and all appliances for proper management of the sewers.

Chapter 375 of the Laws of 1889 gives ample powers to villages to construct sewers. The appointment of commissioners and the procuring of plans by them are the first steps, and these are easily taken. It is difficult to say what plans would cost in the absence of information as to the detail required in the map. Say $400. They would probably cost less if there are accurate maps of the village streets and property, and would possibly cost more if there are not such maps, and if all property lines are to be laid

down, as would be required in case the cost of the system were assessed upon the property owners along the lines of the sewers. The simplest and in most cases the most equitable plan is to raise the money required to construct the sewers by a general tax. Where the whole village can be so readily and cheaply sewered as Greenport, I think it much the best and most economical. These are questions for the sewer commissioners, however, and are, perhaps, out of place here.

I have yet to hear of a village that has regretted the construction of sewers, even if they are not a complete success from errors in design or construction, and for a village so situated as Greenport, with great possibilities in a business way, and as a summer resort, a system of sewers will be the best paying investment the village could make.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

REPORT

ON

Sewerage of the Village of Wellsville.

UNION COLLEGE,
SCHENECTADY, N. Y., *September* 13, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health:*

SIR.—I have the following report to make of my visit to the village of Wellsville.

It is a village of about 4,000 inhabitants, lying on both sides of the Genesee river, just below Dyke's creek, and draining naturally in quite direct lines into those streams, with the exception of two or three hollows which require outlets through low intervening ridges or filling to prevent water standing in them. A large tannery is located in the angle between the creek and the river, above the creek, close to the fair grounds and the village park.

At present the drainage from the tannery, from which the "fleshings" and hair have been screened, is discharged into the creek and a small branch of it. The amount of this discharge must be considerable, as it results from the washing of about 1,000 hides a day. It is usually discharged at night in a body together. Considerable odor arises from the spreading of the fleshings and hair on the ground to dry, though they are at times treated with lime to reduce the amount of such odor. There is also considerable odor from the liquid discharges, and in summer time from the deposit of organic matter from these discharges on the gravel banks of the stream, then uncovered during the day and exposed to the sun. There are four or five sewers which discharge the drainage from dwelling-houses and business blocks into the river in front of the village, and there are propositions to construct others.

While the odor from the tannery discharges is very offensive, I am disposed to think they are not so dangerous to health as the discharges from the sewers, and it is probable that a few more sewers would render the aggregate of these discharges nearly or quite as offensive in odor as those from the tannery. Therefore, it seems to me that the village and the tannery are on an equality so far as production of nuisance and pollution of the streams are concerned.

Evidently the first thing necessary is to remove the points of discharge of the polluted matters whether from tannery or sewers to a point where there will be no danger of nuisance to the village. This can readily be done by a system of sewers which shall collect the house drainage and empty it, together with the discharges from the tannery into an outlet sewer which shall discharge below the town. Such a system of sewers need take but little surface drainage or roof water as the slope, over most of the village, is towards the river, and the storm waters can be directed into the river and creek at once. The amount of pollution to the river by the storm waters would be small as this drainage would generally be discharged into a larger amount of water than the usnal flow. It will probably be found advisable to put in one or more storm-water outlets from portions not drained directly to the streams, but these should be entirely independent of the sewer system proper, for reasons which follow.

Should the polluting matters be carried to a point below the village and there discharged directly into the stream, the locality of the nuisance only would be changed. It would not be entirely abated, and, while the village might be relieved of the said nuisance, it would be foisted upon the people below the village. These people, as well as any below who wish to use the water for a water supply (as Wellsville itself does above), and are prevented by its polluted condition, can without doubt recover damages for the injury done them, as has already often happened in this State and in other places. To prevent such expense to the village and to prevent injunctions from discharging the sewage into the river, it is advisable to purify the sewage in some way before it enters the river to such an extent that it will not produce a nuisance, and will not appreciably increase the impurity of the water in the river. There are several methods of such purification in use in this and in neighboring States from which

one or more can be selected, which alone, or together, shall produce the desired result at an expense much less than the possible expenses for damages. The tannery refuse is practically a very concentrated form of sewage so far as the proportion of animal matter in it is concerned, and can be treated with the village sewage and in the same manner. Judging from the appearance of the creek at some distance below the tannery, I should think that the action of the tannery liquids would be beneficial, assisting to produce coagulation and deposition of the solids in the sewage in sedimentation tanks. The amount of water to be treated in the disposal works should be kept as small as possible by excluding storm water from all reasonably clean sources.

I called the attention of the village board of health to chapter 375 of the Laws of 1889, as giving a method of procedure towards obtaining the system of sewers above recommended, laying particular stress upon the great economy of procuring a general plan for the sewerage of the entire village, not necessarily to be constructed at once but upon the lines of which all sewers, however paid for, must be constructed, thus insuring in the end a good system all parts of which will work together and will abate the present nuisances, rather than create new ones.

The stench nuisance arising from the drying of the hair and fleshings at the tannery should be abated, and can be by a proper system of artificial dryers, running the vapors through the furnace to destroy the organic matters carried in them.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

REPORT

ON

Sewerage for the Village of Walton.

By Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *October* 19, 1889.

Lewis Balch, M. D., *Secretary State Board of Health, Albany, N. Y.:*

Dear Sir.—I have the honor to make the following report of my visit to the village of Walton:

The village is pleasantly situated in a narrow valley between steep hills on both banks of the west branch of the Delaware river, on the New York, Ontario and Western railroad and the Delhi branch of the same. It has an estimated population of 2,000 to 2,200 (1,389 in 1880). On each side of the river is quite an extent of flat or gently rolling ground, quite thickly built up on the north side of the river, but occupied on the south side by farms and stock pastures and a fair ground, with the exception of a street running along the low bluff next the river. Through the northern section of the village run three brooks, East brook, West brook and Third brook, the two latter entering the river together. The general slope of the ground in the thickly-settled portion of the village, between East and West brooks, is towards West brook and the river, with the exception of a small strip near East brook. East of East brook the slope is quite steep up a high hill. West of West brook the ground rises rapidly, especially beyond Third brook. The reservoir of the Water-works Company is located on Third brook above the village. The flat between Delaware street and the river is subject to overflow during flood times in the river, and a portion of the area between Delaware, Mead, Liberty and Howell streets is also subject to overflow to a less extent when West brook is in flood at the same time that the river is.

village would probably be to divide it into two districts, one south of the Delaware with any convenient outlet, and one north of the river with an outlet near the mouth of West brook. But the Delaware river is a beautiful stream of water naturally of the best quality, and as such a natural source of unfailing water supply to any village or city located within reach of it. The entrance of unpurified sewage into it should therefore not be permitted unless it can be shown to be of no injury to anyone below the village. The present condition of the river as regards reception of sewage and village drainage is as follows. Above Walton on the west branch we find the villages of Delhi, population in 1880, 1,384; Bloomville, 229; Hobart, 390, and Stamford, 522. Below Walton are Cannonsville, 258; Deposit, 1,419; Hancock, 686; Long Eddy, 237; Callicoon, 310; Cochecton, 188; Narrowsburg, 313; Barryville, 271; Port Jervis, 8,678; with others of smaller size, all in the State of New York, and one or two places in Pennsylvania above Port Jervis of some size. The village population at the present time above Walton (on about thirty-five miles of river) may be estimated at 3,500, and that below Walton, to and including Port Jervis, in New York (on about 100 miles of river) at 13,500. It is believed that there is no regular system of sewers in any of these villages, with the possible exception of Port Jervis, the last one on the river in New York. Some pollution must, however, reach the river by drainage from these villages, partly from the ground water, partly from the surface drainage, partly from private sewers emptying into the stream, partly from garbage dumped into the stream and on its banks, and partly from the refuse of manufactories. Examples of all these sources of pollution are at present to be found in Walton. The flow of water under present conditions is probably sufficient in amount at all times to preserve the purity of the water within the limits for potable purposes. When the villages concentrate their sewage and increase its amount by draining the whole, or any considerable portions of their territory, the amount of pollution will be increased, quite possibly, to a point beyond the limits of potable water, during periods of low water. This condition will be approached as the villages in turn recognize the advisability or necessity of sewerage, and construct their systems. On the other hand, the stream is not now in use by any of these villages for purposes of water supply, excepting Stamford, which

is the highest up stream of any and uses the headwaters of the west branch, nor is it likely that any will so use the stream until they become of much larger size than now. The villages are in general along the river bank or on flats a trifle above it, at the bases of high, steep hills. From these hills come small streams of sufficient volume and constancy for all needs yet developed, and it is cheaper to take supplies from these streams by gravity than to pump from the river. The amount of sewage from all the villages, distributed as they are, would not cause nuisance in the stream at any time. There is then no strong *present* objection to the discharge of unpurified sewage into the stream. It is impossible to foresee definitely the future development of the region, and it may well be that at some time in the future the discharge of unpurified sewage into the river would be objectionable. If, therefore, the discharge of such sewage is permitted at the present time, it should be under such regulations that the purification processes can be required at any future time. The plans should be so drawn as to allow of this addition with as little additional expense and as little reconstruction as possible. It is possible to so draw them in the case of Walton with but little present extra expense as to allow the future addition of a system for purification at all times except during high floods, when storage must be resorted to for such periods if the greater dilution by the floods is not considered sufficient to permit the discharge of unpurified sewage. I have omitted in this statement any reference to the use of the Delaware river below Port Jervis, outside the State of New York, since the surveys of the Delaware basin under the direction of Philadelphia authorities show that the pollution now entering the river in the State of New York, or likely in a number of years to enter, bears no very appreciable ratio to the pollution entering it from cities, villages and manufactories on the river and its tributaries after it leaves the State of New York. The purity of the river for water supply to cities in other States would be affected in some degree, and this should in courtesy to them be considered in arriving at a decision.

Respectfully submitted.

CHAS. C. BROWN,
Civil Engineer.

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that under anything like favorable conditions the development of the whole will be quite rapid.

The main portion of the city has been sewered at private expense, without adherence to any definite and comprehensive plan, and consequently is not sewered in a thoroughly satisfactory manner. Indeed, if my information is correct, some portions of the outlet sewers demand immediate reconstruction and enlargement, being sources of damage to property and danger to the public health. These sewers all empty directly into the Hudson river. The West Newburgh district has no sewers, as it lies at some distance from the river, and can not obtain an outlet into the constructed sewers of the city without deep cutting through the intervening ridge, or into the river direct except by a long outlet down the course of Quassaick creek. The amount of population in the district has not in the past justified the necessary expense, which would be quite large for the population now to be served, as it would be absolutely necessary to build for the future as well as for the present.

As population has increased in the district, the lack of drainage has caused an increase in the extent of the nuisances thereby caused, until they now call for immediate attention and thorough treatment. I found a very bad state of affairs in my inspection of the more thickly settled portions along Broadway and West streets and others near. House drainage is run out upon the streets, whose grading and paving is such as to permit the formation of pools, giving opportunities for decay and resulting nuisances. Privies are set over holes in the ground near wells and streams which flow into ice ponds from which much of the city ice supply is gathered. Slaughter-houses discharge their refuse into the same streams. All together produce a state of affairs which must be simply unbearable at times. I am informed that the outbreak of diphtheria to which Newburgh has lately been subject, manifested itself with greater virulence in this portion of the city than in any other, and was more difficult to reduce to subjection. The observed conditions would certainly lead one to expect this.

I know of no method of satisfactorily remedying this state of affairs other than a system of drainage and sewerage. It is absolutely necessary that such a system should be provided at an early day to render the locality a safe place of residence. It

is a matter of policy for property-holders and will enhance the value of property greatly. Failure to put in a system will, without doubt, greatly retard the development of the section. It is a matter of interest to the whole city, both from a sanitary and from a financial standpoint. From a sanitary standpoint it will be profitable to the whole city to assist in securing the needed sewerage, as portions of the district in their present condition are a constant menace to the health of the entire city, being originating or propagating places for diseases which spread throughout the whole city entirely or to a greater extent on account of these unhealthy spots. Without doubt the healthfulness of the rest of the city will be improved to an appreciable extent by an improvement of these localities. From a financial standpoint it will be profitable to the whole city to assist, as the tax-list will be largely increased by the development of this section, and this development will be assisted by a good system of drainage and retarded without it. As already stated it will be necessary to reconstruct some of the outlet sewers already laid, and a definite and equitable policy in this matter should be now decided upon. I believe it to be the experience of all cities and villages that it is much more satisfactory to all concerned to have a division of the expense of sewers between the corporation and the property-owners directly benefited than to assess the entire expense upon the property directly benefited. It is certainly the most equitable method if the above argument is of any value. Indeed, some corporations where an entire system is in contemplation pay the entire expense with no direct assessment upon property-holders other than the tax-rate assessed in the usual way.

As to the proposed plan I have but little to suggest, not deeming it my province under the present circumstances to enter into a detailed criticism of the design. It would be possible to run a sewer, that would drain all the territory except that immediately on the banks of the creeks, along Washington and South William streets until the dividing ridge is passed, and thence to the river by some new route or through some old sewer, which would necessarily be reconstructed. Perhaps 3,000 feet of such a sewer would be from 30 to 40 feet below the surface and a second sewer to serve the same street would need to be laid nearer the surface. The main sewer must be laid at a grade near the minimum until the dividing ridge is passed, and would for this distance be of

very large size to carry the requisite flow. Though the proposed outlet sewer is of use as an outlet only, and not as a receiver for drainage along its immediate course, while a sewer on the above-described route could be used for both purposes, with the exception noted, I am disposed to think that the sewer as proposed is the more economical, when the less cut and smaller size on account of the greater fall are taken into consideration. A detailed computation would determine the question. I would suggest, as reducing the cost of the outlet sewer somewhat, the scheme of putting in a storm-water overflow into Quassaick creek at a point below the last mill at which the water is used for other purposes than power, through which the excess over a maximum estimated flow of sewage should run into the creek.

The lower portion of the line of sewer can thus be reduced to a size sufficient for the flow of sewage only. It would perhaps be advisable to allow some additional size to take the earlier and more polluted portions of the washing from streets during rain storms. The flood-water from rains would dilute the sewage sufficiently to prevent any evil effects from the overflow into the stream, during the period of rainfall, especially as the volume of the stream would also be increased by the rainfall draining directly into its channel. A sewer for sewage only has been suggested for the whole line as a method of reducing the cost. This plan is not advisable, I believe, as it will not meet all the requirements of the case and will necessitate a reconstruction of the whole or of the upper portion of the outlet in the near future. I see no great objections to the line as laid down. It is always advisable to follow street lines as closely as possible, but it is sometimes enough more economical to follow lines of depression to pay for the extra trouble and expense necessary in obtaining rights of way for construction and subsequent inspection and maintenance. The line must follow the creek after it reaches it, but could follow the line laid out or the street lines above, as may be deemed best.

I found the opinion general that sewers were necessary for this district, the only question being as to the method of paying the cost. It is pretty nearly a matter of life or death with the inhabitants of the district, and they are justified in going to any length short of actual confiscation of their property in getting the sewers. But they are not the only persons interested. The city as a whole, as I have tried to show, is only less interested than

the district itself, and would be fully justified, as a measure for its own protection, in paying for the sewers by a general tax. Since both have so great an interest, it should be practicable to arrange an equitable division of the cost, and thus relieve the district of a portion of the expense, the whole of which is so nearly prohibitory to it. I am indebted to the city engineer, Mr. Charles Caldwell, C. E., for information and assistance.

Respectfully submitted.

CHARLES C. BROWN,
City Engineer.

REPORT

ON

Sewerage for the Village of Clinton.

CHARLES C. BROWN, C. E.

UNION COLLEGE,
SCHENECTADY, N. Y., *December* 1, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.:*

DEAR SIR.— I have the following report to make of my visit to the village of Clinton, Oneida county:

The village is estimated to have a population of 2,000, a growth from 1,236 in 1880, and has quite an appreciable tributary population immediately outside the village limits, which increases quite materially the number of those producing in some degree the need for sewerage and drainage. The village is located near Oriskany creek, has two or three small brooks or rivulets running through it, and the bed of the abandoned Chenango canal skirts the hill on which most of the village is located. That portion of the village between the canal and Oriskany creek is rather flat and in general quite low. There are no engineering difficulties in the way of sewerage and drainage of the remainder of the village. The canal bed for a certain distance belongs, I believe, to the village. A public water supply was put in a few years ago by the village authorities, obtained from a stream above the village and taken near its source. This supply is of excellent quality, excepting that it is quite hard, coming as it does from strata of carbonate of lime. The reservoir and the stream feeding it seem to be in good condition, with the exception that a road crosses the stream several times within a short distance above the reservoir. It would be easy to prevent any contamination of the water by turning the course of the brook or road or both slightly, and so

grading the road or covering the brook as to turn the road drainage away from it. If the hardness is due to bicarbonate of lime in solution, it can be reduced by the addition of common quicklime, either dry or dissolved in water, the resulting compound being carbonate of lime, which is comparatively insoluble and will settle on standing. The amount of lime to be added will depend upon the degree of hardness of the water. It can be added in one operation at the reservoir if a proper settling basin is provided, or by each consumer.

The drainage of the village seems in general to be good. The slopes of most of the streets are sufficiently rapid to insure prompt removal of surface water, and there are water-courses enough to carry it all out of the village without injury to any one if ordinary precautions are taken. The streets are, some of them, in need of grading to insure prompt removal of water, especially on the flatter grades. Many streets need paving or thorough cleaning at intervals, especially in the fall, the numerous trees supplying a large amount of leaves, which mingle with the mud produced by the fall rains and give rise in their decay to offensive odors.

The greatest need of the village is for sewerage. The surface soil is usually quite porous, being in large part sand or gravel, and is underlaid by clay of irregular conformation, or by the limestone of the region, with a dip to the southwest, the general slope of the surface being to the north and northwest. No provision is made for the carriage from premises of house drainage or fecal matter, except on portions of two streets where sewers have been laid, and they are disposed of in garbage and ash-heaps, by leaching cesspools and privy pits, or by drains running to the nearest water-courses, or to ditches along the sides of the streets. Many of these drains are of very imperfect construction, and but little attention is paid to proper connections with them. The results of these conditions and practices are seen on inspection to be very bad. In the first place, the wells are extremely liable to pollution. Some wells have been abandoned, as too much polluted for use; others are under suspicion, and it is probable that all wells in the older portions of the village, and many in other portions, would be found to be more or less polluted. This is of considerable importance, as the village water supply is not yet in very general use — partly on account of the difficulty

of disposing of the water when used. The ground air, and thence, in many cases, the air of the houses is polluted by the leachings from the cesspools and privy pits. This is aggravated in some cases by the presence of drains with open joints running under houses or starting from cellars without traps. There have been a number of cases of diphtheria in the village and its immediate vicinity this fall, and it is the testimony of the town health officer that most of these cases occurred in houses where there were some local unsanitary conditions such as those mentioned. Diphtheria being also a contagious disease, it is not to be expected that entire freedom from unsanitary conditions should always secure immunity from the disease when unsanitary conditions and cases of the disease occur in the neighborhood. The statement made by one physician, that there has been more or less diphtheria in the village for many years, with something very like an epidemic twenty years ago or more, is excellent evidence of the staying powers of the disease where unsanitary conditions exist. Judging by the estimated increase in population since 1880, these unsanitary conditions are now increasing more rapidly than heretofore. There have been occasional cases of typhoid fever in the village, which are usually traced quite clearly to unsanitary conditions, especially to pollution of well water. There are many complaints of the obvious nuisances occasioned by the open ditches along certain streets, and by the discharge of the house drainage into the small streams and into the canal bed. That these complaints are well founded was made clear by our inspection of these localities. All visited are evident sources of pollution to the air and must give rise to almost unbearable stenches at times during the year. The same is true in considerable degree of the sewers that have been laid in Marvin and College streets, due no doubt, in large part, to the fact that a considerable portion of the discharge from these sewers is deposited at or near the mouth of the sewer in a small brook, running sluggishly in a low-arched passage, there to decay and form noxious gases which are drawn up into the sewer, to find outlet at man-holes and through cellar drains and untrapped house-drains.

The only sure remedy for these evils is prompt and effective removal of the obnoxious materials from the premises and the village in such manner as to prevent nuisances on the premises, in the process of removal, or at the place of deposit. The cheapest and

best method of securing this removal, where there is an abundant supply of water, as here, is by water-carriage or sewerage. Since the street drainage can in general be well taken care of on the surface, it will be necessary to design a system for house sewerage only, with only so much provision for rain-water as may be found necessary to provide for places not readily drained otherwise. It will be very easy to lay out a system that will reach every house in the village, except a few on Elm street and on Water street at the north limit of the village, by running a main sewer down the canal-bed from College street to Sherwood brook, and branch sewers down each street to this main sewer. My data are not sufficient to determine definitely whether this would be the very best plan, but I am quite well satisfied it would be the cheapest. If the population outside the village limits were to be taken into consideration, as would seem advisable from a sanitary point of view, a considerable change from this plan would be necessary. In whatever direction the sewage is run, its discharge unpurified into any stream within reach would be likely to cause just complaint, and, when the entire system is at work, positive damage. To prevent this, the sewage should have its objectionable solids removed, and it should be further purified as far as necessary to render it innocuous below the point of discharge. It will be possible to do this in such a manner as to remove all cause for just complaints for a very reasonable sum, and it will be necessary, as there is no suitable place for the discharge of unpurified sewage into a stream within reach. To sewer every street in the village, about four and one-half miles of pipe would be necessary, including the main sewer in the canal. Owing to the fact that nearly all the lines would be short and on steep grades, small pipes (eight inches in diameter) can be used on nearly all streets, and the cost, if but little rock is found to excavate, will be quite light. I estimated $30,000 as the entire expense of the system, including disposal works, and think, on further consideration, that the cost for a complete system on the lines suggested will not vary much either way from this figure. While an entire system is not absolutely necessary at this time, it will no doubt be the most economical method of procedure to put in the whole system, if the village is in financial condition to make the necessary arrangement for the capital at low rates. It is, I think, quite necessary for the well being of the town that a portion of the

sewers should be put in as soon as possible — at least the main sewer in the canal bed, a sewer along the course of the creek between Fountain and Mulberry streets, from the canal to Kellogg street, and branches in those streets, and William street above Kellogg street. It would be advisable also to put in a sewer in Franklin avenue. If the sewers already in Marvin and College streets can be utilized, a considerable portion of the whole work will then be accomplished.

It has been the general experience of villages and cities putting in sewerage that the death rate of the corporation is diminished by a very appreciable percentage through the resulting improvement in sanitary conditions. The death rate of the village of Clinton is very high for a village, being each year nearly as great as that of the large cities, so far as I have been able to separate the accounts of the village and the town of Kirkland. This is quite abnormal as the vital statistics of the State Board of Health show. Should the estimate of 2,000 inhabitants be too large, the death rate has been computed too small. It is shown by the statistics that the death rate from zymotic disease and consumption will be especially reduced by a system of sewers properly constructed and maintained.

A meeting for discussion of this subject was held on the evening of my visit and was largely attended by those interested in improved sanitation. It was there suggested that the desired results could probably be obtained most easily by a sewer commission appointed and acting under chapter 375 of the Laws of 1889. By vote of those interested as legal voters in the corporation a committee was appointed to draft resolutions to present to the village trustees, stating that it was the sense of this meeting that certain sewerage was necessary, and requesting their early attention to the matter.

Respectfully submitted.

CHAS. C. BROWN,
Civil Engineer.

REPORT

ON

Sewerage for the Village of Norwich.

By Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *December* 27, 1889.

Lewis Balch, M. D., *Secretary State Board of Health, Albany, N. Y.*:

Dear Sir.— I have the following report to make upon the question of sewerage for the village of Norwich, Chenango county:

My report upon the Eagle hotel gave a description of the present method of disposing of sewage throughout the village, except that in most cases there is no attempt to make tight privy vaults, it being rather the intention to making leaching cesspools. The Eagle hotel presents the greatest nuisance because of local condition, such as the three-story privy, because of the greater accumulations, and of its situation in the midst of a closely built-up section, but there are numerous other places that approximate more or less closely to the condition of this hotel, and are only less obnoxious because more carefully cared for, less in amount, or less closely surrounded by buildings.

The village has about 5,500 inhabitants, who are located reasonably close together, with but few outlying scattered houses. It is situated in the bottom of a valley, with the Chenango river running near the base of the hills on the east and Canasawacta creek at the base of those on the west, the two streams and an east and west line between them, as shown on the accompanying map, forming the village boundaries. The ground surface in the village is in general rather flat, with a slope to the east and south. There are two gravelly hills thirty to fifty feet or so high, as indicated by the portions of the map shaded with lines running northeast

and southwest. The creek at the crossing of Main street is twenty-five to thirty-five feet above the river at the crossing of the same street, and Cortland street at Broad street is about the same amount above the creek at the Broad street crossing. The fall of the creek from the Broad street crossing to its junction with the river, is, perhaps, six or eight feet. These differences of elevation are estimated from some levels taken for Dr. L. J. Brooks by Mr. E. F. Musson, and from some approximate determinations of my own; and are sufficiently accurate to show the possibilities of the case. The approximate cross-section shown at the bottom of the map is taken from a map prepared by Dr. Brooks and shows the relative depth of the layers of loam, gravel and clay under the village on a line diagonally across from northeast to southwest. The porous nature of the soil near the surface, and the general slope towards the southeast give rise to an underground current of water in that direction, whose flow is quite marked, as observed in wells and other excavations reaching down to it. This flow was also marked on the surface formerly, as indicated by the double broken line with two branches running across the map from northwest to southeast. These water-courses are now filled in great part and the flow of water in them is cut off, except in times of extreme high water in the creek. The shading lines running from northwest to southeast indicate localities where the subsoil water is sufficiently near the surface or its flow is sufficiently restricted to render the ground wet on slight provocation. From a report of the health officer, Dr. S. M. Hand, I quote, substantially:

"This subsoil water rises to the top of the gravel even in times of greatest drought, and in wet weather rises into the loam and in many places causes damp and wet cellars. It is the habit of the village to dig the privy pits down to the gravel, so that the ground water stands in many of them and carries away their contents. The same method of disposal is practiced with slop-water and other filthy liquid wastes from dwellings. They are thrown into cesspools dug so deep that their contents leach away into the gravel stratum and are dissolved into the ground water."

The effect of the cesspools and privy vaults upon the subsoil stream is evident and the pollution of all wells taking their supply of water from this stratum is certain. Many wells go through the underlying clay to the water-bearing gravel below, but their entire

purity is questionable since it is quite difficult to keep out the water from the upper stratum. The village has a water supply belonging to a private company which is, I understand, in quite general use, so that the use of wells is not compulsory except on account of expense. The pollution of the subsoil and water is very dangerous from another reason, as it is a producer of noxious gases which pollute the air in the soil above the water, and this air is drawn or forced into houses, to be breathed by the inmates, especially in winter, by the action of the heat therein and at times of high water by the displacement of the ground air by water. This condition is especially dangerous in the more crowded portions of the village, where houses, cellars, cesspools, privy pits and wells are set close together and have, through the porous soil, close connection with each other. The direction of the current of subsoil water makes the pollution thereof of special interest to the inhabitants of the southeastern portion of the village. The reported condition of the gravel from excavations — coated dark steel blue or grayish blue — is optical evidence of the pollution of the subsoil. I am disposed to think that the rapid current and the large amount of subsoil water have operated to so dilute and remove a portion of the pollution as to postpone the evil day for the village, but such fluctuations in the level of the subsoil water as result from wet seasons such as we have lately been experiencing will result, upon a general lowering of the water level in the dry season to follow, in leaving a considerable amount of this pollution in the ground to act as above described. Were it not for this stream the condition of the village would be much worse than it is at present. This natural advantage is not, however, sufficient to remove danger, it has only postponed the beginning of the attack. The village has, indeed, recently had an epidemic of cerebro-spinal meningitis, which, while it may not have been caused by this subsoil pollution, was no doubt localized by existing unsanitary conditions. Dr. Brooks, the president of the board of health, in a paper before the American Climatological Association, has shown this in quite a conclusive manner. I abstract from his paper what has not already been stated above. "The general character of the soil is: First, a layer of loam varying from two to four feet in depth; second, a layer of gravel and sand, shallow in the lower portions, but at the southwest bluff from twenty-five to thirty feet deep, and underneath this a layer of

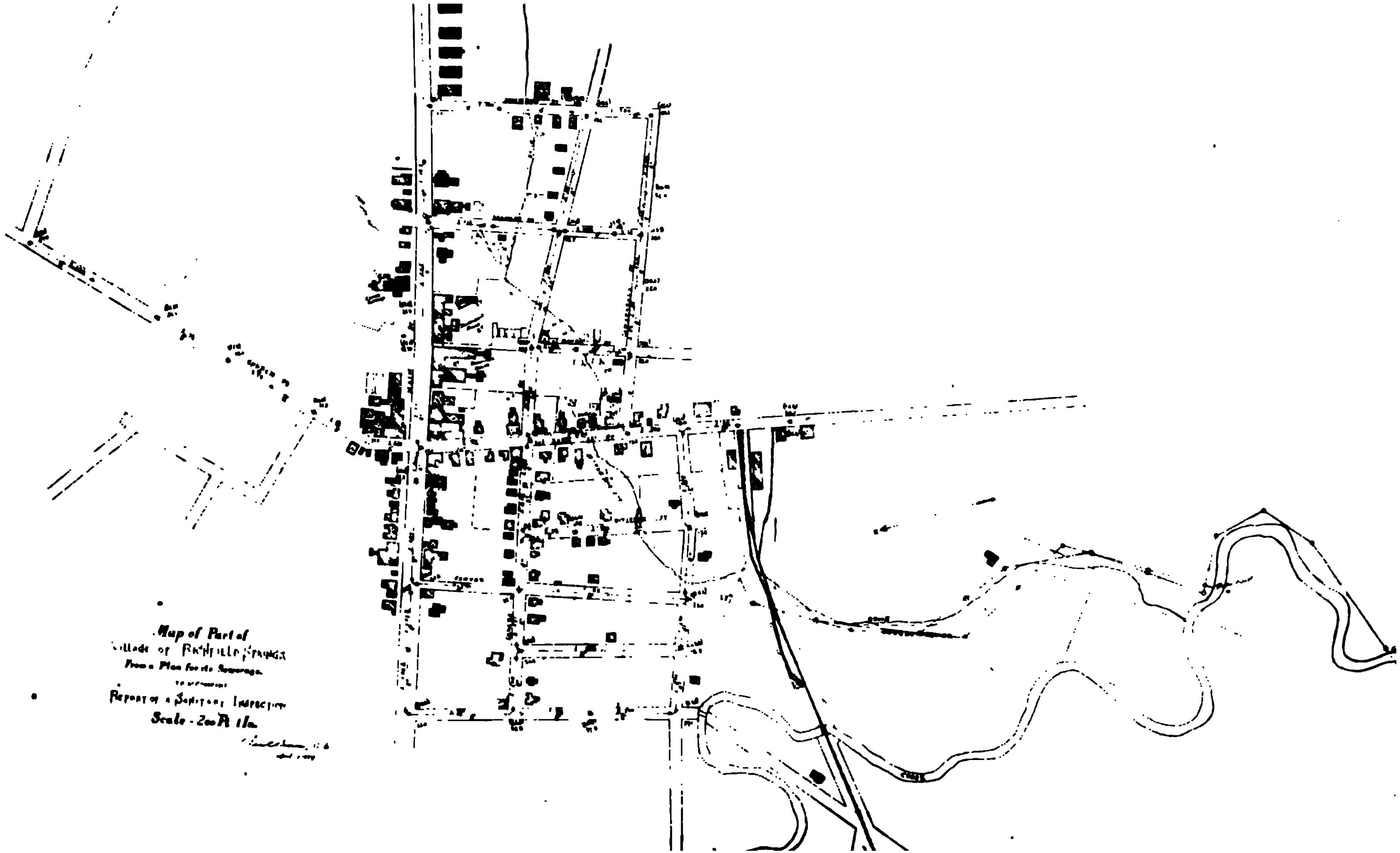
impervious blue clay at a varying depth from the surface. For about four years the water-works have delivered to the houses water which, when polluted, is discharged into the soil. Stables, shops, a tannery and an abandoned canal basin used as a common cesspool are maintained in the northeast section, and slaughter-houses and hog-yards were maintained in the north and northwest. The southeast section is next in order of sanitary conditions, and the southwest last and best. Accumulations in the shallower cesspools and on the surface were not carried off as easily as usual, owing to the severe winter preceding the epidemic as evidenced by the work found necessary by the board of health. In much the greater number of cases local unsanitary conditions were found. The relative number of cases is given on the map, and their distribution; each case being located. The village is divided into four districts by Main and Broad streets, which follow closely the order of sanitary condition above, with due allowance for the direction of the subsoil stream. But two cases occurred upon the hill portions of the town, and these were in particularly susceptible subjects." Places similarly situated, which have had epidemics of zymotic diseases have been reported upon in published reports of the State Board of Health, and may serve as examples of what may be expected in time at Norwich. The increased percentage of deaths from zymotic diseases in the last two years, as shown by the reports of the State Board of Health is probably due to the increase in unsanitary conditions. That percentage has been for these two years over one-fourth the total number of deaths in the village, while the percentage for the whole State is but little over one-fifth the total number of reported deaths in the State. The death rate for 1888 was quite high for a village, 22.18 per 1,000, and so far this year with no epidemic, is not low for a village, 18.59 per 1,000 population. The decrease in death rate is doubtless due in part to the work of the board of health during and since the epidemic, but, notwithstanding the decrease in death rate, the percentage of deaths from zymotic diseases to the total number of deaths remained the same as during the year of epidemic zymotic disease, indicating a cause more difficult to reach than surface unsanitary conditions. The death rate is computed in the State board bulletins on a population in the village of 5,500. It does not agree with the rates given in the health officer's report above referred to, but there are typograph-

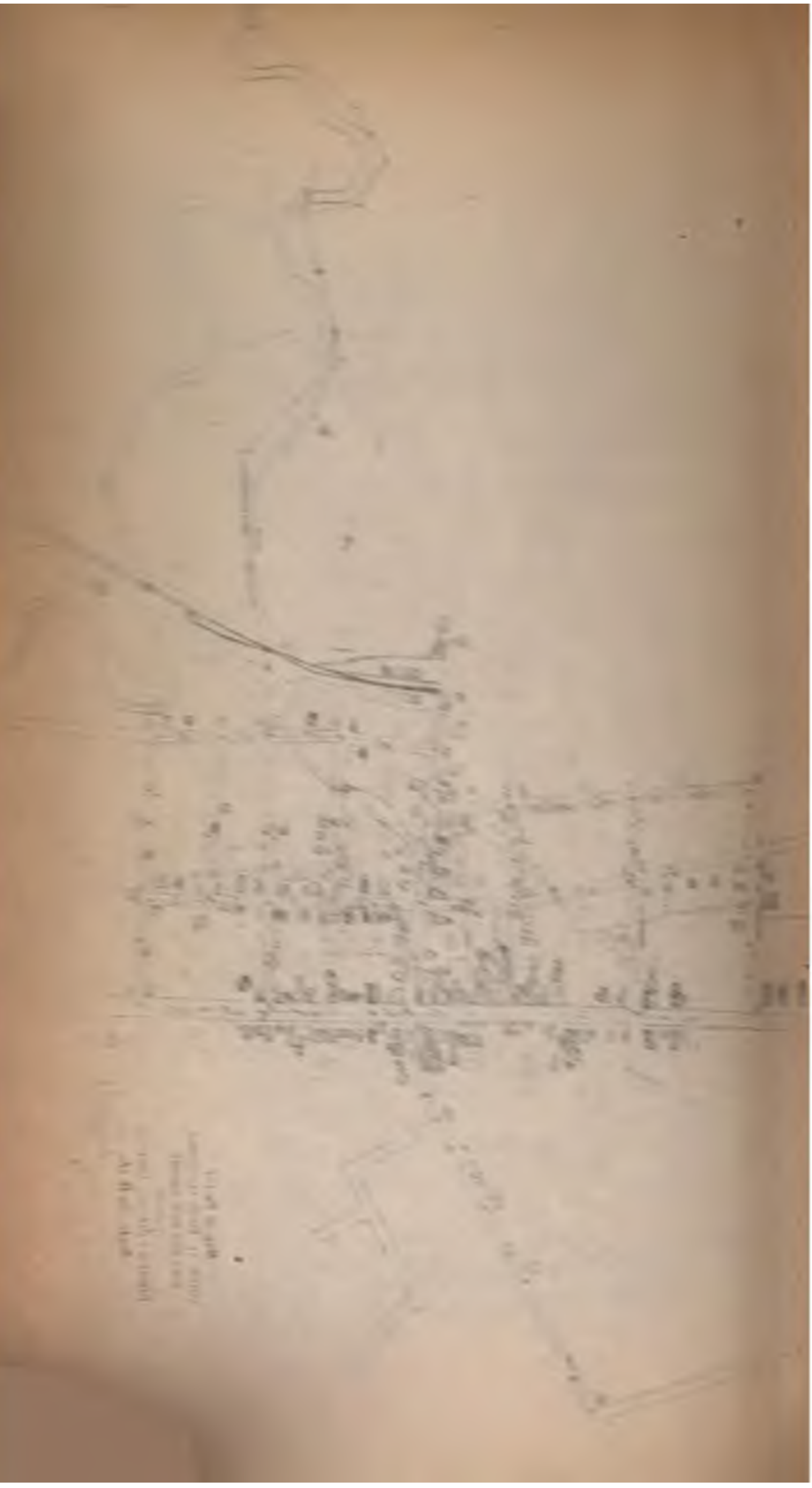
ical errors therein which cause its figures to disagree among themselves. If the population given on the map is correct (4,978) the death rate would be much larger and excessive even for a large city. About the most striking argument for sewers for Norwich, because the most evident to the senses, is the necessity of properly getting rid of the present nuisances in the shape of the large privies and cesspools about the several hotels and business blocks, and of wastes from stables, manufacturing establishments, etc.

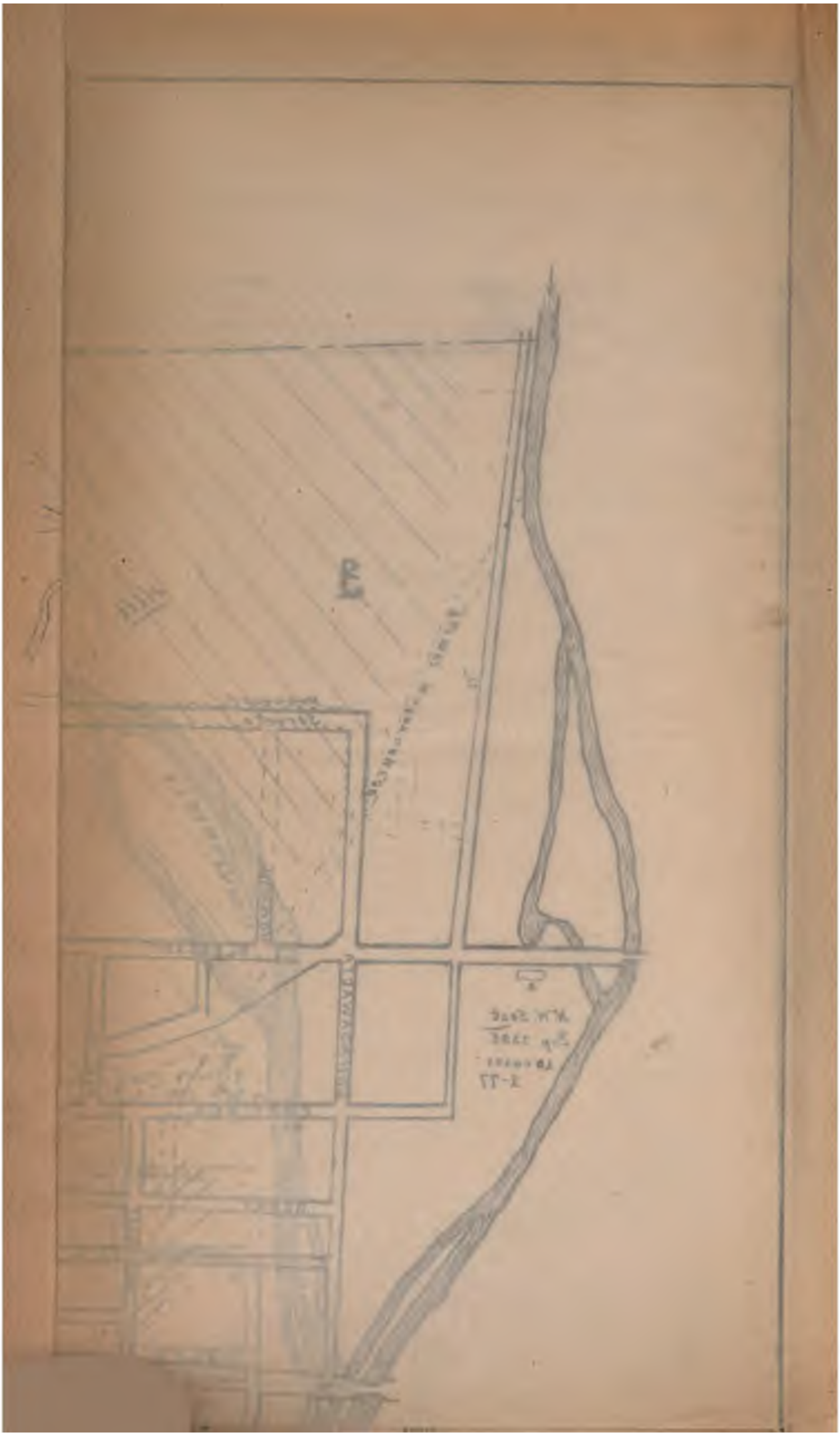
The village is fairly well located for taking care of its surface drainage, and when the important streets are graded, with this in view, it will in general not be necessary to carry off such drainage by underground channels. In the few cases in which it may, at any time in the future be deemed advisable to construct these channels, they can most economically be constructed quite independent of the sewer proper. The greater proportion of the roof water can be taken care of with the surface drainage, and that leaves only sewage and manufacturing wastes to dispose of. Pipes for carrying these may be quite small, from eight inches up in diameter, with no brick sewers and the expense for materials will thus be made a minimum. A careful study of the locality will be necessary to determine the exact lines of the sewers, the position of the outlet, the amount of roof water which should be admitted, the sizes of pipes necessary, etc., and thus to make a close estimate of the cost. My investigation has only been sufficient to show the feasibility of the construction and the general necessity of the case. There are about thirteen miles of streets in the village upon which enough houses are built to justify a sewer, but of these there are only about eight miles which would probably be considered as greatly needing sewerage, for a good many years. These distances include in each case the length of outlet necessary. It will be necessary to comply with the sanitary principles concerning purity of streams, to purify the sewage before admitting it into the river, to the extent of insuring that the purity of the stream below the mouth of the sewer shall not be appreciably affected. This is not extremely difficult now, nor very expensive. It will be possible, however, to use some chemical method only, unless the sewage is pumped to some height and distance, owing to the fact that the ground available to a gravity system for filtration or irrigation is liable to be overflowed by the river and creek. I see no great engineering difficulties in the way of an economical construction

of a system of sewers discharging through a chemical purifying apparatus into the river. There is without doubt sufficient fall; but a short length of outlet that is not also used for house drainage directly will be necessary; there is no rock or quicksand; while some water may be met with, the length of trench through wet places will not be great and drain-tile laid along the trench beside the sewer-pipe will lower the level of the ground-water considerably. While it would cost $90,000 to $100,000 to sewer the whole village, I think it is possible to sewer that portion of the village which is in any appreciable need of it, and construct the necessary purification works for the whole system for $60,000. The portion of the village in which sewerage is at this time actually demanded by the existing conditions could be covered by less than half this amount, the sizes of pipes and the purification plant used being those designed for the whole system. The subsoil and cellar drainage will be taken care of by a line of drain-tile laid alongside the sewer, where necessary, the sewer itself being water-tight. It is estimated that the maintenance of the system including disposal works will cost from fifty to thirty cents per annum for each person if the population tributary to the sewers, the cost per head diminishing with the increase in tributary population.

Chapter 375 of the Laws of 1889, gives an excellent method of procedure for obtaining sewerage systems in villages. The sewer commissioners there provided for can obtain plans for the sewerage of the entire village and estimates of the cost of the entire system and of any parts thereof. It is, of course, not necessary to construct the entire system at any one time, but whatever is constructed is in accordance with the plan and under the direction of the sewer commissioners. This makes the work actually done conformable to a definite plan so that when additional work is contemplated it will never be necessary to reconstruct any already done, with the consequent waste of money. This in some places one of the greatest bars to progress in sewerage. Certain sewers are constructed with no reference to anything but the property directly served, and when additional sewers are desired those already constructed are too small or at too great an elevation or unsuitable in other ways and must be reconstructed. The consequent expense is often almost or quite prohibitory of proper


Map of Part of
From a Plan for the Sewerage
Scale - 200 ft 1 in





sewer extension. The act referred to gives the surest method of obviating such troubles. It prescribes methods of securing plans, of procuring the required approval of the State Board of Health, of obtaining by vote or assessment the funds necessary for the construction, etc., and is applicable to Norwich as to all other villages of the State.

Respectfully submitted.

CHARLES C. BROWN,

City Engineer.

REPORT

ON

Sanitary Condition of Richfield Springs.

April 22, 1889.

To J. F. GETMAN, Esq., *Secretary Board of Health, Richfield Springs, N. Y.:*

SIR.—As a result of my visit to Richfield Springs on April eleventh, in company with Mr. Brown, C. E., to investigate the general sanitary conditions of the place, with especial reference to the large hotels, the drainage, water supply and the probable cause of typhoid fever which occurred in the fall of 1887 and the summer of 1888, I would state the following:

General sanitary conditions. It appears that every effort is made by the local board of health to enforce the rules and regulations made and published by them for the better protection of the public health. This work is greatly aided by the village trustees and the majority of villagers, who thoroughly recognize its value and importance. The village is in consequence fairly free from the usual nuisances of general character so often found.

Accommodating as it does about 3,000 or more summer residents, and these chiefly in the large hotels, it is of vital importance that the sanitary arrangements of these buildings be in perfect condition. The Spring House and Carey Cottage were found thoroughly plumbed and drained, soil-pipes properly trapped and drains ventilated. The Tuller House was altering its old-fashioned closets to suitably trapped and flushed modern ones, and all the drains were being connected and ventilated. The American House and Davenport House had still old-fashioned vaults, faulty in construction and of menace to health. We were assured, however, that the proprietors of these houses intended changing their closets in conformance with the directions of the board of health. When this is done, the hotels will all be in as perfect sanitary condition as plumbing and drainage can make them.

The village is sewered by what is known as the separate system. Apparently the sewers are well-built and well-planned. They do

not have flush-tanks. The overflow from the springs, however, takes the place of flush-tanks to a great extent, sufficiently so as insure a cleanly condition of the sewers. The recommendation of Mr. Brown that the old wooden drain be done away with is one that meets approval. It is not considered, however, that the present condition of this wooden sewer is menacing, but that for more perfect work it should be changed for the vitrified tile.

The water supply, by the analysis of Prof. Willis G. Tucker, State analyst, is shown to be free from sewage contamination but affected by vegetable matter. This, which can easily be removed, is not a cause for anxiety or alarm, the slight impurity being of vegetable and not animal origin. The intention of the trustees, as told me by one of the number, to pump this summer every day from the lake to supplement the ordinary supply, and thus prevent any lowering of the reservoir, with the further fact that all of this water will, before entering the mains, be passed through a filter, insures the water supply to be perfectly safe for potable uses.

It appears difficult, if not impossible, to obtain sufficient data to clearly decide what caused the cases of typhoid occurring in the hotels last summer. The cases appearing in the house of Mr. Clapsaddle in November, 1887, can unhesitatingly be stated to have originated from impure air from insanitary drainage and faulty privy vault. The cases occurring at the Carey Cottage, American, Davenport and Tuller Houses, are not so easily accounted for. Two at least, the first one at the American House, and the first at the Carey Cottage, may fairly be considered to be imported. None could have come from the three cases at Mr. Clapsaddle's house. By analysis of the water, made last year, it was shown the disease did not originate there. But from all conditions found, and the number of cases stated as having occurred, the disease could not be said to be either endemic or epidemic.

Your letter advises me that the trustees are to cover in Manley creek. This will undoubtedly be a benefit, as a running brook is a handy place to deposit dangerous and unsightly objects, and undoubtedly the action of the trustees will be beneficial. In conclusion, I would make the following summary:

From the inspections made, the analyses of water had, the statements of those conversant with the outbreak of typhoid last year, I should state Richfield Springs to be in excellent condition,

from a sanitary point of view, that the hotels, the changes to be made in the two mentioned, are as safe for persons to live in as plumbing can make them, and that typhoid fever is neither endemic nor epidemic, the cases of last year being exceptional.

Absolute freedom from every and all disease can not be expected anywhere. As far as Richfield Springs is concerned it has had its natural healthfulness added to by the intelligent work shown in its drainage, water supply, and the efficient working of its board of health.

Very respectfully, your obedient servant.

LEWIS BALCH,
Secretary.

REPORT OF ANALYST.

BUREAU OF CHEMICAL ANALYSIS,
ALBANY, *April* 18, 1889.

DEAR DR. BALCH.— I inclose reports on the three Richfield waters. Nos. 1 and 2 had no signs of pollution, though No. 1 is somewhat better than No. 2. The reservoir water *might be better* but is by no means bad. Free ammonia somewhat less than last fall and albuminoid ammonia *not half so high as then.* Total solids less and water softer showing more dilution. Taking the analysis in connection with that made for W. Crain last fall I shall say the water was in much better condition and seemingly free from contamination by animal matter.

Yours truly.

W. G. TUCKER,
Public Analyst.

No. 59.

[Parts in 100,000.]

Source, special spring, Carey Cottage, Richfield Springs, N. Y., No. 1.

Date when received, April, 16, 1889.

Color and appearance transparent, colorless.

Odor at 100° F.	None.
Chlorine	0.25
Free ammonia	0.0017
Albuminoid ammonia	0.0070

Nitrites	None.
Total solids	22.80
(Residue, white.)	
Loss on ignition	1.20
(No color or darkening.)	
Mineral matter	21.60
Total hardness	18.02

Remarks.—Good water.

W. G. TUCKER,
Public Analyst.

No. 60.

Source, same spring as No. 1: tub in yard of Tuller House, Richfield Springs, N. Y. No. 2.

Date when received, April 16, 1889.

Color and appearance, transparent, colorless.

Odor at 100° Fahr	None.
Chlorine	0.25
Free ammonia	0.0021
Albuminoid ammonia	0.0091
Nitrites	None.
Total solids	22.40
Residue	White.
Loss on ignition	1.10
(No color; slight darkening.)	
Mineral matter	21.30

Remarks.—Much the same as No. 1. Ammonia and albuminoid ammonia slightly higher, but is probably free from sewage pollution.

W. G. TUCKER,
Public Analyst.

No. 61.

Source, supply pipe, Village Hotel, drawn in village of Richfield Springs, N. Y. No. 3.

Date when received, April 16, 1889.

Color and appearance, turbid, greenish.

Odor at 100° Fahr	Slight.
Chlorine	0.18

Free ammonia	0.0028
Albuminoid ammonia	0.0140
Nitrites	None.
Total solids	8.60
[Residue almost colorless.]	
Loss on ignition	1.20
[No appreciable odor or darkening.]	
Mineral matter	7.40
Total hardness	7.00

REMARKS.— Color and appearance of water not very good; chlorine and free ammonia low; albuminoid ammonia high but probably due to vegetable matter.

W. G. TUCKER,
Public Analyst.

INSPECTOR'S REPORT.

UNION COLLEGE,
SCHENECTADY, *April* 15, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.:*

DEAR SIR.— I have the following report to make of our visit to Richfield Springs on April eleventh, to investigate the causes of the cases of typhoid fever in that place in 1887 and 1888. The report is not as satisfactory to myself as I would like, owing to the numerous discrepancies in the statements of the persons consulted to obtain the facts in the case. The following is the best conclusion I have been able to draw on weighing the evidence offered. The most of the statements made need further investigation to establish their truth, and if you think it necessary I can probably clear up some points (probably all but the actual number of cases of typhoid fever, and their probable *immediate* causes) by another day's work on the ground. What follows is as near the truth as I can get at present.

The cases occurring in the fall of 1887 were at the house of Mr. Clapsaddle, on Lake street. There were three cases. The house is indicated on the accompanying sketch by Mr. Clapsaddle's name and (3 J). The condition of the house at that time is said to have been as follows: A small brook runs from back to front

of the lot on which the house stands, being near the house at its rear and adjacent to its foundation near the front. The brook turns at the front corner of the house, runs very close to if not under that corner and diagonally across the yard in front of the house to a culvert under the street. From the place where the brook comes close to the foundation to the opposite side of the street it is covered over, as indicated on the map. To dispose of kitchen slops a four-inch vitrified pipe without trap was put in to run from a slop-hopper in the rear room of the basement to a line of six-inch tile on the opposite side of the brook from the house. The six-inch line began at the rear end of the lot and was laid at such a level as to receive a part of the brook water. It ran thence along the brook to a point 100 feet or so below the street (Lake street), where it crossed the brook by an invert forming a trap, and entered an old wooden box-sewer. When this trap was taken up last spring it was found to be completely stopped up so that, probably for some time, all matter discharged into the pipe remained in it a considerable length of time to ferment and decay, the only escape being at the upper end of the six-inch tile and at leaky joints if there were any. A large part of the gases formed in the process of decay would enter the house through the untrapped slop-hopper. It is supposed that no human excrement was discharged into the slop-hopper. The basement of the house is on a level with the bank of the brook. The first story is eight or nine feet above, on about the level of Lake street. The privy of the house is built on at the back as indicated by the small projection on the plan of the house shown on the map, and is entered from the first floor by an outside door opening on a small platform, so that there is no door opening directly from the privy into the house. There is no vault, but the deposits collect on the surface of the ground at the rear of and adjoining the rear basement room where there is apparently only a board partition. The furnace supplying hot air to the upper rooms is in a basement room in front of the rear one and separated from it by a loose board partition. This furnace has no cold air duct from the exterior of the house. If my information is correct, the first case of fever developed in a rear sleeping room of the first floor, adjacent to the privy and over the rear basement room, with a window at the rear close by the privy. There is a cistern in the rear basement room. The

so-called "separate" system, without flush-tanks, and the sewage is emptied into the creek shown at the southwest of the village, near its entrance into Canadarago lake.

The supply of ice for the village was formerly taken from this lake, but that used last summer was taken from the reservoir and lake from which the water supply is drawn.

The box-drain mentioned above runs through the village as indicated by the broken line, with two or three branches. It is supposed to have but few if any connections. In my opinion it is a source of danger and it should be thoroughly eliminated and any connections with it transferred to the sewer if they are other than cellar or surface water-drains. The brook should be covered to prevent its pollution by rubbish and garbage, and all connections with it forbidden except cellar drains and surface water drains, from which all house drainage of whatever character is rigidly excluded. A sewer pipe, tight jointed, of sufficient size to carry the greatest amount of water ever running in the brook would be the best medium. All connections with it should be trapped to insure safety. No privies of any sort should be permitted in the central portions of the village, and the proper trapping of all connections with the sewers should be insisted upon. A thorough inspection of the sewers should be made by a competent person. While it may be found to have been unnecessary from one standpoint, it will indicate that all possible means of removing any possible reason for the spread of the fever have been used, and will on that account be worth what little it will cost. Those branches with an inclination of less than about one in 250 should have such inspection at frequent intervals, since there are no flush-tanks in the system.

Respectfully submitted.

CHARLES C. BROWN,

Civil Engineer.

REPORT

ON THE

Sanitary Condition at Lake George.

By Dr. F. C. Curtis.

ALBANY, *August* 22, 1889.

To Dr. LEWIS BALCH, *Secretary State Board of Health:*

DEAR SIR.— Various reports as to the sanitary condition of the village and summer resort of Lake George at the head of the lake of that name received at the office of the State Board of Health and referred to the local town board of health of Caldwell, led the latter board to request an inspection, in answer to which, at your request, I went there yesterday for that purpose.

The allegations have been that in recent years typhoid fever has occurred in some of the hotels there, and also, within two or three years, diphtheria; that the former disease has again appeared this season together with a number of cases of diarrhœa or dysentery. It is also said that rumors are heard and spread about as to the extensive prevalence of typhoid fever and the existence of bad sanitary conditions there.

Lake George has a permanent population of some 500 people and during the summer months a transient population of two or three times that number in the hotels and boarding-houses. It is situated at the head or southerly end of Lake George in the town of Caldwell. It is about 350 feet above the sea level. The lake as is well known, is for the most part closely surrounded by well-wooded mountains or high hills, which rise abruptly from the shore. At this point these recede for a little distance and the village is situated upon a somewhat level area, well elevated above the lake, the shores of which are generally abrput and free from swampy or saturated soil. The prevailing character of the soil

here and throughout a large extent of territory about is sand. This extends, I believe, to an indefinite depth and if underlain by clay, it is far beneath the surface. There is enough intermixture of alluvium with the fine yellow sand that generally prevails superficially to secure a fair degree of vegetation and the growth of trees of the pine variety; below is coarser sand and mixed with it gravel and drift. At few points rock comes to the surface. A few small streams enter the lake which appear generally clear and rapid, their volume varying with the rainfall. The draining away of soil water is perfect in this porous soil. I was unable to learn at what level it is reached in digging as there are no wells in the village I am told. The cellars, of which I inspected a number, are all of them free from moisture. With the exception of one or two marshy lagoons from the lake, near which there are no dwellings, the drainage of the soil is everywhere as perfect as possible.

The water supply both for the private and public houses is brought from the hills for the principal part of the village on the western side of the lake. As far as I could learn by inquiry, no question can be raised as to its purity, as it is taken from springs and streams quite free from contaminating surroundings; it is also abundant in quantity. The lake is used to supply water, partially, on the western side; the water from it is not so free from question.

As to the sanitary history of the place the reports are not free from conflict. It appears evident, however, from the statements of the medical men that as far as the existence of typhoid fever is concerned, it has heretofore shown itself only sporadically. There is no evidence that at any point it has ever been epidemic. Some seasons there have been two or three cases, others none at all. Diphtheria broke out three or four years ago, having been doubtless imported, but it did not become established, for no cases have been reported since.* Diarrhœal diseases have not been prevalent. Other zymotic diseases have not occurred.

During the present season there has been one case of typhoid fever. The subject of it is a young man, resident of the place. He was taken in July and has not yet recovered, being now in the fourth week of his sickness. There is no doubt of the propriety of the diagnosis; the origin of the case is not however apparent. Within

*See report of this in second annual report of the State Board of Health, page 94, by Dr. Adamson.

a fortnight there have been several cases of dysentery. Three of these occurred in one house almost simultaneously, and two of them, both children, died. These were all residents of the place. No one else in the house, in which there were a number of summer boarders, were affected. In two nearly adjacent houses, both private residences, there were also cases, one in each, at about the same time. It is said that several cases of similar character have occurred at other parts of the village. The characteristic symptoms are frequent bloody stools, with tenesmus, running an acute course, all dysenteric. Outbreaks of dysentery in this sudden way, attacking numbers of individuals simultaneously, constitute a recognized feature of the disease; how to account for them and what bearing imperfect sanitation may have upon them, is not however clear.

Aside from these cases I gathered that the health of this community was good. The mortality reports of the town of Caldwell to our bureau of vital statistics, so far as they have been recorded, do not show the prevalence of any zymotic diseases.

My inspection was made in company with members of the local board of health, and we visited each hotel and boarding-house, some private residences, the school-house and depot and their surroundings. I found, as already said, the natural conditions of the locality very good. The drainage of the soil is perfect and the drinking water of good quantity and quality, easily accessible from the hills. It only remains to speak of how the disposal of animal and vegetable waste is effected, and how much it is allowed to disturb the healthy condition which nature has provided.

The only systematic means for the disposal of house waste is by means of drains leading to cess-pools. All the hotels and boarding-houses are provided with these. But few of the private residences have them, and slops are thrown upon the surface. These cess-pools are all leaching, being simply pits dug into the ground, and at the top covered over with two or three feet of earth. Generally they have an opening for ventilation. Sometimes there are two or three connecting with each other, to provide against overflow, which, however, is very unlikely to happen since on account of the porosity of the soil the fluid contents leach away rapidly. Sometimes they are said to be opened and cleaned out every year of solids that may be retained, but frequently they are undisturbed for years.

These cess pools receive the ordinary kitchen and house waste. The hotels are generally provided with water-closets, and these also empty into the cesspools. Where there are no water-closets in the house the ordinary privy pit is generally used.

Formerly drainage was largely into the lake, which furnished an easy and ready means for sewage disposal. This is now prohibited by a special law, and has been generally stopped and should be entirely. The water of Lake George is altogether supplied by local springs, and has no considerable inlet; consequently it has no appreciable current, and can be readily defiled. The law against draining into it should be energetically executed.

The cess pools, it should be said, are not complained of as offensive; doubtless the air is contaminated by escape of gases from the ventilators, but where sufficiently distant from the house this is not appreciable. Generally they are not less than seventy-five or one hundred feet from the house, and should in no case be allowed nearer than that. In two cases I found them nearer, and in one of them I am satisfied that the contents of the cess-pool are percolating into the cellar, being but a few feet distant from it. I call the attention of the health officers and of the proprietor of the hotel to this flagrant condition, which must be immediately remedied. In no other case did I find any manifest evidence of soil pollution.

Water-closets are used only in the larger hotels. In their stead there is the common out door privy. There is little to be said of them except that they have generally the undisturbed pit excavated in the earth, foul and malodorous as such places usually are. Occasionally a removable receptacle takes the place of the excavated pit, and attempts were found at the use of dry earth absorbents, but I saw none that was effective through lack of intelligent application of the dry earth system. All were alike offensive, some having larger accumulations than others.

As to the places rendered suspicious by reason of sickness, the typhoid fever case is in the person of a young man, a resident of the place, living with his father who keeps a boarding-house for summer boarders. No other case of the disease has heretofore occurred in this house, a good sanitary history of which is reported, nor are there other cases of sickness there. The patient has been employed about the depot, of which place I will speak later. The house and premises are in a cleanly condition, the yard

sloping towards the lake with a ventilated cess-pool, some seventy-five feet distant from the house. There are but two fixtures, both for slops, in the house, and both trapped, though rather insecurely, by so-called bell traps. Two privies, one of them having a dry earth arrangement, are in the yard, and neither is properly cleaned, though in no worse condition than most seen.

The houses chiefly affected by dysentery are at the north end of the village. No noteworthy insanitary condition was found about them. It is worthy of remark in this connection that similar outbreaks have been reported from other parts of the State.

At the hotel where two or three cases of typhoid fever occurred last year, the Crosby-Side, on the eastern side of the lake, and remote from the village, the sewage, which includes water-closet discharge, is received into a cess-pool made tight by two courses of brick laid in cement. By means of a steam pump this is emptied several times a day into another cess-pool, perhaps 1,000 feet or more away from the hotel, this cess-pool being simply a long, covered ditch, from which the contents leach rapidly into the soil. It is quite remote from any dwelling; the surface about it is well covered with rapidly growing vegetation, and it seems the best considered attempt at sewage disposal here. It would be better if instead of this terminal cess-pool the sewage were disposed of by surface irrigation. The waste drain from the house is ventilated by means of a chimney flue, an error to which I called attention and which should be remedied. The house is supplied with water, partly from the lake and partly from a spring. Whilst no sewage appears to enter the lake here, it is a question whether the water is pure enough for potable use; light might be thrown on this by a chemical analysis. Perhaps, too, the spring is not as remote from the chance of being reached by leakage from drains as would be desirable, and although this is not probable it would be much better if a water supply were secured, as it no doubt easily could be, from springs higher up on the hills and far from all possible source of contamination. The house is on well elevated ground, about 100 feet from the lake, and its sanitary condition is in the main good. It is said that the first case of fever last year was an imported one and possibly the others were secondary to it. The hotel is reported to have had a clear health history prior to last year and to be free from sickness this year.

My attention was called to the condition about the railroad depot. This is upon a wharf of open piles which extends beyond it into the lake. It is provided with hopper closets, which empty into a cess-pool seventy-five or 100 feet distant and not far from the edge of the lake. The wharf is the stopping place for the steamers, which carry several hundred passengers every day up the lake. One of them remains here for the night and the water, which is quite shallow, receives the waste from them as well as the sweepings from the depot, as is apparent from collections of waste matter on the bottom and about the piles, and some aquatic vegetation. An ill odor is said to arise here sometimes. This will probably be remedied if the deposit of waste matter of all kinds in the water at this point and especially from the steamers is stopped. This should be done.

You will observe that I have not found evidence that Lake George has been unhealthy, nor that, except in a few minor points — to which I called the attention of the local health authorities — the sanitary condition is to be very seriously criticised or calling for urgent and immediate reform.

As to the cess-pool, it is condemned by all who have to say about sanitary matters as an evil to be put up with only when no other way of disposal of sewage can be found. The leaching cess-pool is especially prohibited. One that is water-tight may serve a purpose, often necessary, of being a temporary receptacle for sewage which can be from time to time removed from it to a place of final disposal. If, however, it is not water-tight, the contents leaching into the soil at a point too deep for the roots of most growing plants to reach and appropriate it, in the course of time defile it. Its contents percolate into the surrounding soil and into wells and cellars if such there be sufficiently near.

The method of sewage disposal is the chief thing to condemn here. I do not think that any place could present conditions more favorable to their safe use than here; the soil is extremely porous to an unknown depth so that the fluid material can soak downwards for a long time without coming to the surface; the population is so sparse that they can be put far away from the dwelling; most of them are used only two months in the year, and there are no wells into which they can percolate. As I have said, some are much too near the house, but if 100 feet or more rom any dwelling, at a level below the cellar and used for only a

short time each year, I dare say there might be no trouble from them for a considerable time.

It would be a great deal better, however, if some less rudimentary way of disposing of sewage were devised. Instead of putting it out of sight underground where it can change but very slowly back into the harmless inorganic matter which is its final destination, it would be better to effect this speedily, and so dispose of it at once, either by intermittent downward filtration, by means of which it is brought to the roots of growing plants and so appropriated, or by chemical precipitation. The latter method of sewage disposal is working with satisfactory results at several places now and is probably the best plan for places like this. The sewage is carried by means of a sewer, which need not be a large one, to a tank where it can be treated and disposed of in a harmless way. As a health resort, the prosperity of which depends much upon its being beyond criticism in sanitary affairs, nothing should be omitted that will help it in this respect. As long as cess-pools remain it should be seen to that they are remote from all dwellings and they should be frequently cleaned.

As to privies, if some general system of sewage disposal is adopted they can thus be entirely done away with. Lacking this, some material improvements in them should be made. Leaching pits, excavated into the earth should be entirely done away with, those existing now being cleaned out and filled up with fresh earth. In their place a water-tight receptacle should be placed which can be readily removed and emptied. The dry-earth closet, if intelligently used, is one of the best substitutes. The trouble is that it generally is not intelligently used. To be effective it is necessary that enough perfectly dry earth or coal ashes be used every day to completely absorb all fluids and gases and render the place odorless. This can be done, but my observation is that it frequently is not. The so-called pail system at least for the summer months, offers the best means of safe disposal, of this form of waste, galvanized iron pails or tight wooden receptacles being used and regularly removed and emptied once a week or fortnight.

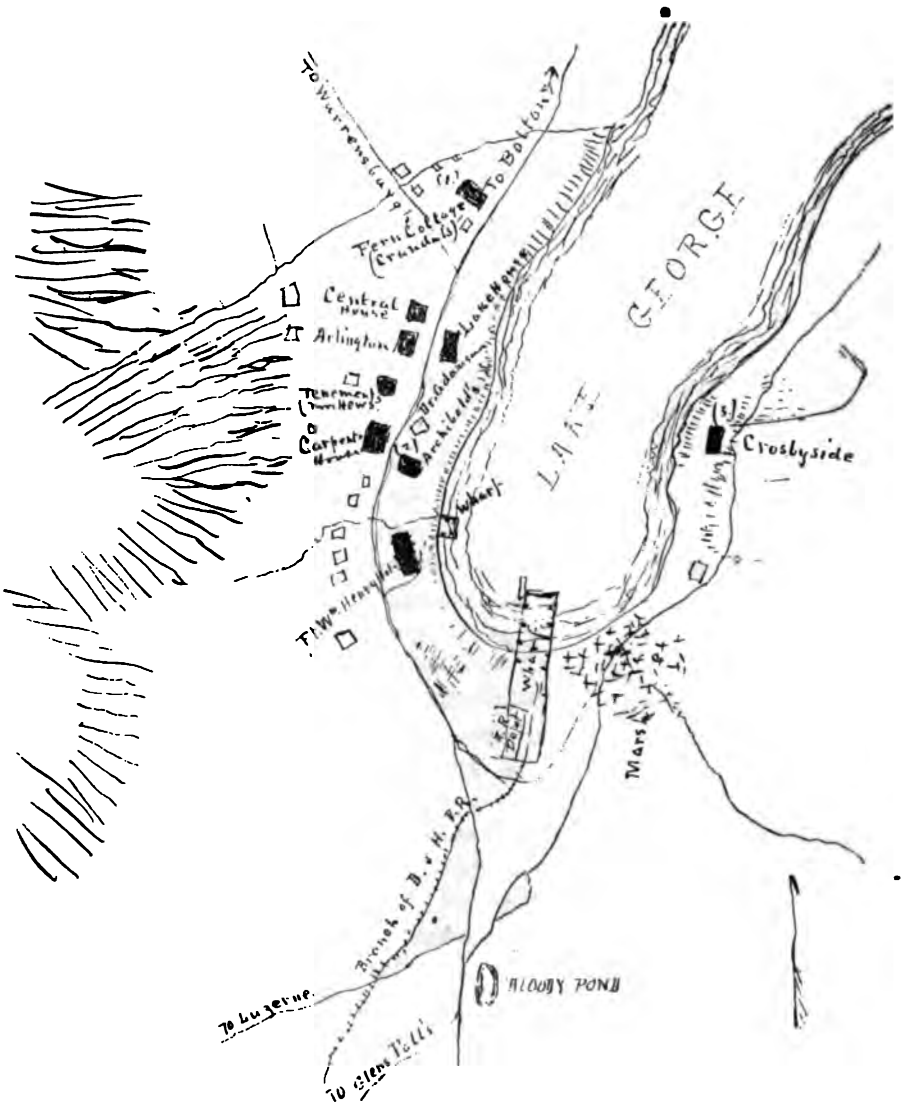
With its excellent natural advantages no place should be healthier, and even with the neutralization to these to some degree incident to the accumulation of a considerable number of people here, especially with reasonable attempts to remedy them such as

have been indicated, there is no good ground for regarding it as other than what it purports to be, a health resort.

There are faulty details as I have noted that ought to be remedied. The present method of waste disposal, as long as continued, ought to be made as free as possible from incident evils. More scientific methods ought to be planned and adopted. The water supply had better all be taken, as most is, from far up on the hills where nothing can render it impure. The lake should be preserved in its natural purity. While there are few places under the sanitary supervision of the State Board of Health freer from criticisms, even as things now exist, still I make these suggestions, not only because the place is one whose prosperity depends on its healthfulness, but also because, in any case, it seems highly desirable that they be soon carried out.

Respectfully yours.

F. C. CURTIS.



Lake George.

1. Fern Cottage (Crandall's) & one or two houses adjoining where cases of Dysentery occurred
2. Archibalds, where case of Typhoid exists
3. Crosbyside Hotel, where Typhoid Fever occurred last year.

Report on Sanitary Inspection of Cohoes.

By Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *June* 4, 1889.

Lewis Balch, M. D., *Secretary State Board of Health, Albany, N. Y.:*

Dear Sir.— On May thirtieth I visited Cohoes in accordance with your letter of May twenty-eighth. I was requested by the officials of the local board of health to inspect and report upon four nuisances at the places marked A, B, C and D on the accompanying map of a part of the city.

A.— We have here a deep ravine with several branches at the bottom of which flow the brooks indicated on the map. Up one of these the railroad runs. All the streets indicated upon the map are laid out and built upon except those shown by dotted lines. All the houses on the streets north of a line passing approximately along Columbia street, Bowery and Johnston avenue, and west of a line along the railroad, drain into these ravines. There is a sewer in Johnston avenue into which houses on that street drain. There are a few houses on the east side of the railroad which drain over the surface or through a line of pipe into the ravine. The water-courses in the ravines are open above Johnston avenue. Below that avenue the water-course is covered and forms a sewer of old fashioned and unscientific construction, which follows approximately the dotted line on the map and empties into one of the ditches of the Cohoes Water Company on the south side of Ontario street near Olmstead street. Thence it runs in this ditch under buildings and streets to the Mohawk river. The amount of water flowing in the ravine is in ordinary seasons very small, and its flow is much obstructed by vegetation and by rubbish. A large amount of house drainage and drainage from privies and water-closets is emptied upon the sloping sides of the ravine or by means of pipes, into the water-course. As a consequence, the greater portion of the ravine is a great nuisance to sight and smell

during a large portion of the year, and is a menace to the health of the neighborhood which is becoming more and more nearly unbearable as the number of houses draining into the ravines increases and the flow is restricted by filling in. It would have become much worse than it now is, if heavy rains did not flush out the bottom at intervals. To add to the nuisance in the neighborhood of Johnston avenue, the upper end of the sewer beginning at that point, is open and the gases generated in the sewer there escape. The amount of these gases must be very large at ordinary seasons in comparison with the amount of sewage, for, so far as I inspected the sewer, its bottom is flat, of planks not laid close together nor so as to give a uniform slope. In times of ordinary flow, the solid matters are deposited to ferment and decay. This sewer receives the Johnston avenue sewer. It is evidently the intention to fill up to a higher level the ravines and to build upon the street lines indicated by dotted lines on the map.

There is no doubt but that the nuisance should be abated for the benefit of the health of the neighborhood and on account of the obnoxious odors. Under the existing circumstances, probably the best method of abating it will be by continuing the "ravine sewer" up the bottom of the principal ravine to a point at or beyond the last street whose drainage reaches the ravine, *i. e.*, to a point near the corner of Boudrais avenue and Elm street. Branches to this sewer can be laid in the streets as they are filled in and built upon. This extension of the sewer must be large enough to carry the storm water draining into the ravine, as well as the sewage. It should not have a flat bottom like the portion already built but should be less in diameter near the bottom than anywhere else, so that the dry weather flow can be concentrated into a flowing stream and so prevent the deposit of the solids in the sewage as much as possible. Proper arrangements for ventilation without causing nuisance should be made. This will be difficult so long as the bottom of the present sewer is left in its present form and condition. All house connections should therefore be thoroughly trapped and the catch-basins for the reception of surface drainage should be trapped where the escape of gases would give rise to nuisance.

B.—This is an old ditch which formerly received the overflow from the Cohoes Company's canal near Ontario and Olmstead streets. Other courses are now used so that this one usually has

but a small stream of water running through it. On the day of my visit a large volume of water was running through it so that I was unable to inspect it. It was certainly receiving a good washing out on that day, but this treatment is said to be very infrequent. Numerous water-closets and privies empty into it and much garbage and refuse is thrown into it. This gives rise to nuisance during the periods between flushings. This matter was examined and reported upon by Horace Andrews, C. E., in August, 1885, and his report is printed on page 232 of the Sixth Annual Report of the State Board of Health. His recommendation for the treatment of the case is the best that could be suggested, unless a better method can be devised in connection with a comprehensive plan for the sewage of the city, as suggested farther on. That recommendation is that a tight sewer with properly trapped connections be laid in the bottom of the ditch, and that the remaining space be completely filled with clean material.

C.— Along the south side of Columbia street, near James street, are several low spots whose drainage is very defective, principally because the channel is choked with vegetation and rubbish or is stopped by fills for streets, whose culverts have broken or become filled. There is but little house drainage here now. When houses are built, the holes will be filled and the present bad condition permanently remedied. It is easy and cheap to open up the channel and allow the water to flow as long as the low spots remain unfilled, and this should be done. The drainage from houses into the open channel should be prohibited. A sewer runs down Columbia avenue with which the house drains can find entrance. The channel itself has a connection with this sewer near the corner of Trull street.

The Columbia avenue sewer empties into an open ditch on the west side of the Erie canal, and runs therein along the canal to a ditch or water-course below lock No. 11 or 12, and thence under the canal and through the city to the river. Evidently there is opportunity here for a first-class nuisance, and it is quite apparent to the senses.

There appears to be no fixed system of sewerage in the city, and sewers are emptied into the most convenient of the many water-courses, natural or artificial, which run through all the lower parts of the city. Where there is always a large amount of water running in such courses at a high velocity, some justification

of such a course may be found in the comparative safety of the method, and the high cost of laying sewers in solid rock. But there are portions of the year when little or no water runs in these channels which are anything but smooth. The coverings are not tight, indeed, are open directly into areas and houses for the purpose of receiving drainage and sewage. As a consequence, large quantities of sewer gas are generated, which give rise to effluvium nuisance, and are a constant menace to the public health. When the channels are practically abandoned as water-ways, and receive large amounts of water at very infrequent intervals, the duration of the nuisance and the danger to health are very much increased, as in the case B above. And when the sewer is emptied into an open ditch which otherwise receives nothing but the surface water in times of rain, the nuisance caused is even greater. It will probably be quite difficult to design a good system for the collection of the sewage, and rather expensive to construct such a system, owing to the way in which the Cohoes Company's canals cut up the ground, and to the fact that most of the excavation must be made in solid rock; but it can probably never be done more cheaply than at present, all things considered, and it will probably be more economical to treat the present nuisances in connection with such a general plan than to treat them independently, with the possibility that that treatment will not work in with a general system when it is adopted.

D.— Near the first reservoir of the water-works on Egbert street, are privy vaults, which, it is claimed, fill up with water which percolates through the reservoir embankment. An examination of the locality leads me to think that this may be so, and if it is true, the elevation of the vaults is such that the water in the reservoir, when low, is subject to pollution by percolation back from the privy vaults. To prevent such pollution the vaults should be made water-tight, or much better since it is quite difficult to make the vaults water-tight and keep them so, a sewer should be laid in Egbert street, and the vaults ordered to be thoroughly cleaned and disinfected, and filled with clean material. I understand that only a short line of pipe sewer would be necessary, as there is already a sewer in Egbert street as far as Jay street, or thereabouts.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

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REPORT

ON

Pollution of Well at Philmont.

ALBANY, *September* 12, 1889.

DR. LEWIS BALCH, *Secretary State Board of Health:*

DEAR SIR.— In the case of the alleged pollution of the well of Mr. Fowler, of Philmont, from a neighboring privy pit, satisfaction regarding which he has failed to secure from the local board of health, I found to-day the following conditions:

The dwelling of the complainant and that of his neighbor are on the main street of the village and about sixty feet apart. Between them is a rough excavation in the rock for a cellar. The neighbor's house is higher than Mr. Fowler's and the ground surface back of it is considerably elevated, consisting of bare slate rock. This surface slopes towards Mr. Fowler's house, across the vacant lot at an angle of about forty degrees, his premises being thus some fifteen or twenty feet lower than the highest part of neighboring premises; in fact, this latter is higher than any of the surrounding house yards.

On top of this elevation is the privy that is complained of. It is at the rear end of the lot, which is 140 feet deep and is not less than 100 feet from Mr. Fowler's house. It has a capacious pit, excavated in the slate rock and is partly filled, having evidently not been cleaned out for a considerable time. It is used by twelve or fifteen people. Back of it a garbage pit, which has, however, been cleaned up recently and replaced by a tight hogshead.

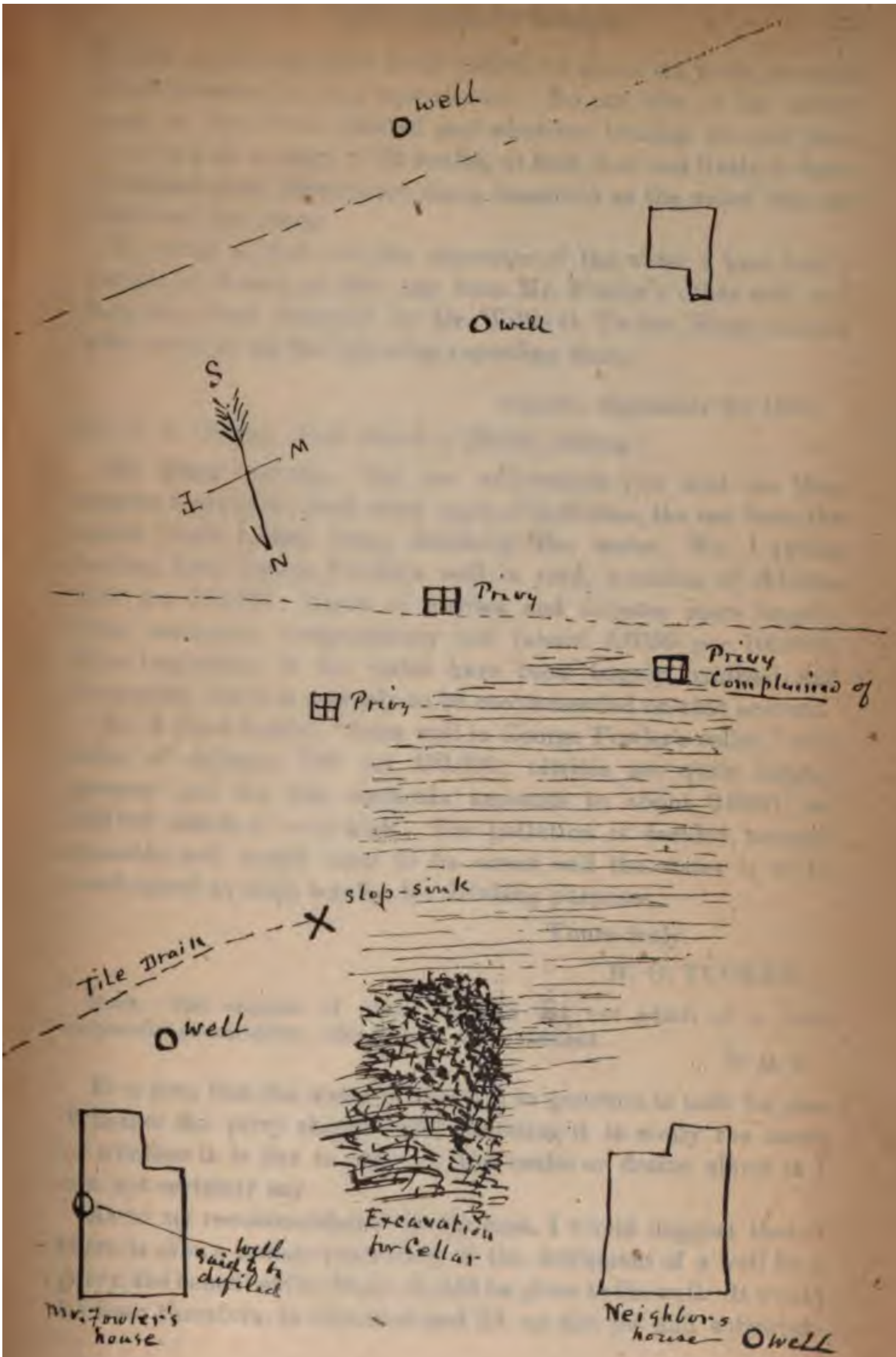
The well, which it is claimed is defiled by this privy, is in the cellar of Mr. Fowler's house. It is not inclosed and is partly under one wall of the house. The water in it rises to pretty near the surface. The well has not been used for years, as its water has been offensive to taste and smell, the owner having another

well, concerning which he makes no complaint, situated at the back of his house.

I have drawn a hasty diagram of these and adjoining premises, which will assist in locating various points. It will be seen that the privy in question is about equally distant from the wells of these two neighbors. It is about seventy-five feet from the well on premises to the rear, and about 100 from one in the street south of it, which latter is used by the employés of an adjacent factory. It has thus at least five wells in a radius of about 100 feet; it is also considerably elevated above them all. The water of all is said to be perfectly good, except the one in question. It is also noteworthy that there are two privies, one of them Mr. Fowler's, which are nearer the spoiled well than the one complained of is. At the same time it is worthy of note that Mr. Fowler has a slop-sink back of his house conducting to a tile drain, which passes, in its course to an outlet, within ten feet of the well he now uses and perhaps twenty-five from the other.

The privy in question is located, as I have said, on bare slate rock of compact structure, into which its pit is excavated. As you know, the layers of this rock lie at all inclinations, from perpendicular to horizontal. In this case their dip is nearly perpendicular. The course or direction in which these layers lie is nearly east and west. I have attempted to show this by the parallel lines on the diagram. It will be seen that the course is not such as would allow of fluids percolating between the layers to flow toward either well shown in the sketch, but rather such as would lead to the rear part of Mr. Fowler's yard, if such percolation took place. At least this is what appears from an inspection of the surface. Mr. Fowler, however, asserts that there is a seam in the rock that makes a direct channel from the privy vault to his well; that it pursues such a course, in a northerly direction, as to catch any soakage from the yard of his neighbor and then turns under his house and to his well. Possibly this is the case, but I see no way to remove it from the field of conjecture except to trace it up by a complete excavation along its supposed course. I saw nothing on the surface to indicate its existence. Its supposed locality is indicated upon a map of the premises sent to the office some time since by Mr. Fowler.

Such are the principal points found on an inspection of the locality. As to any clinical evidence bearing on the case, Mr.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Mr. Fowler's house
Neighbor's house
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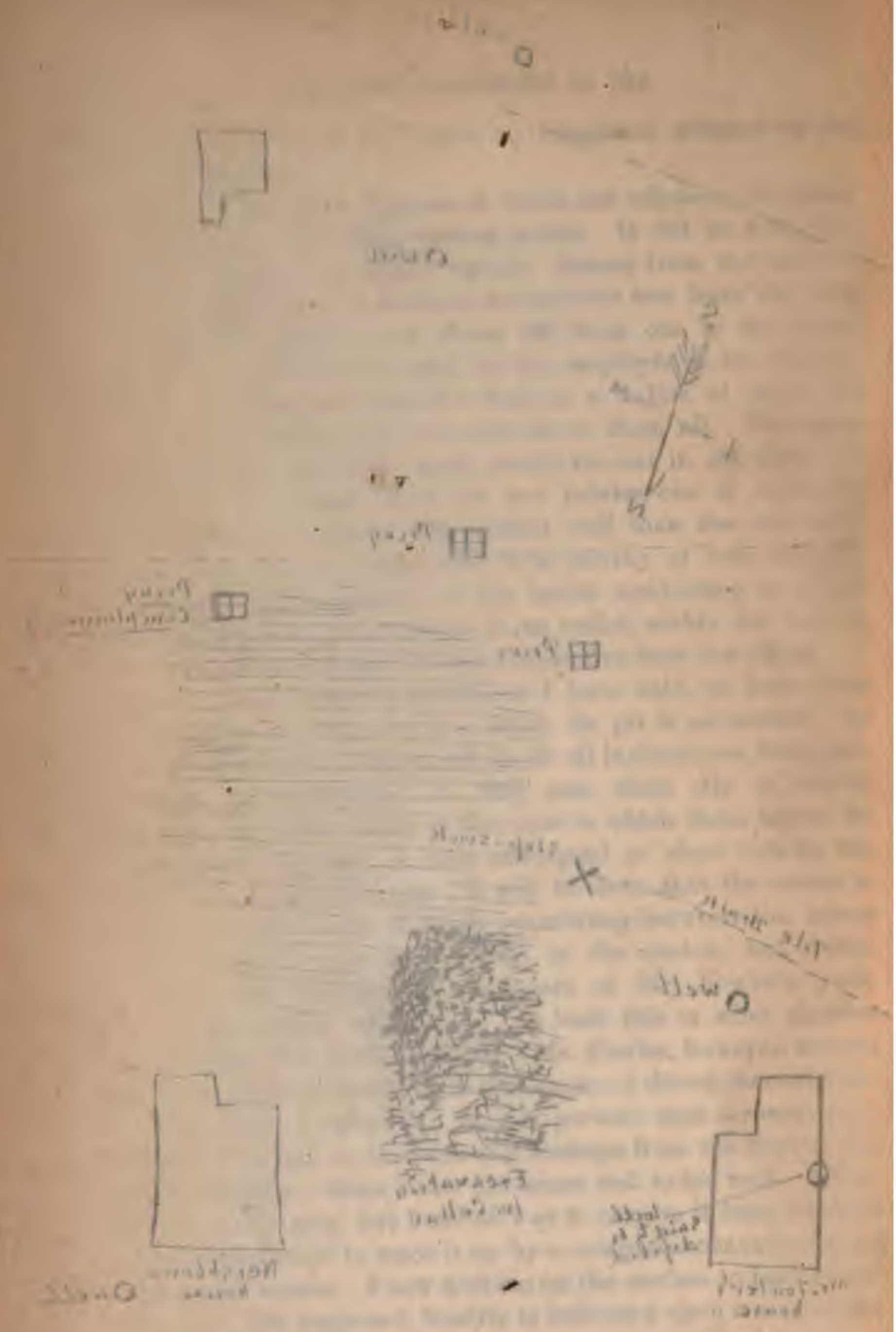


Fowler says he has been in ill health for about six years, or since about the time the well became bad. No one else of his family seem to have been affected and whatever bearing the well may have had as a cause of ill health, at first, it is not likely to have continued such disturbance since, inasmuch as the water has not been used for years.

In order to find out the character of the water I have had a sample of it sent, as also one from Mr. Fowler's other well, and they have been analyzed by Dr. Willis G. Tucker, State analyst, who wrote to me the following regarding them :

ALBANY, *September* 20, 1889.

Dr. F. C. CURTIS, *State Board of Health, Albany:*

MY DEAR DOCTOR.— The two well-waters you sent me September fourteenth, both show signs of pollution, the one from the cellar (dark bottle) being decidedly the worse. No. 1 (white bottle), from George Fowler's well in yard, contains, of chlorine 6.00 per 100.000; traces of nitrites and nitrates more largely. Free ammonia, comparatively low (about 0.0050 per 100.000). The impurities in the water have been largely oxidized and destroyed, but it is scarcely to be recommended on that account.

No. 2 (dark bottle), "from well in George Fowler's cellar," contains of chlorine 7.90 per 100.000; nitrites are quite largely present and the free ammonia amounts to about 0.0800 per 100.000 which is very high. The pollution is decided, unquestionable, and would seem to be *recent*, and the water is to be condemned as unfit, totally, for drinking purposes.

Yours truly.

W. G. TUCKER.

NOTE.—The amount of water supplied did not admit of a more exhausted examination, still, I deem this sufficient.

W. G. T.

It is seen that the water of the well in question is unfit for use. Whether the privy charged with polluting it is really the cause or whether it is due to other of the vaults or drains about it I can not certainly say.

As to my recommendation in the case, I would suggest that if there is even a remote possibility of the defilement of a well by a privy, the benefit of the doubt should be given to the well. It would be best, therefore, to clean out and fill up this pit and substitute

for it a water-tight receptacle which can be emptied at frequent intervals, its contents being deodorizd by absorbents, such as dry earth or coal ashes. As a matter of fact, no privy pits should be allowed in a village, especially when their proximity to a well is a necessity. This one in question occupies an elevated place, on rock liable to seams leading to a considerable distance, and it can not be affirmed that under such circumstances the fluid contents of its excavated receptacle are certain not to percolate to some remote point. All other vaults mentioned in this report, which are in equal proximity to the wells, should be treated in the same way. I have little doubt that all the wells are to some degree contaminated by them. The yard well of Mr. Fowler, mentioned in the report, very probably receives sewage from the drain running near it, which should either be removed or the tile pipe replaced by iron pipe with leaded joints. As to the well, concerning which this report is made, it appears to be superfluous and is surely unfit for use, and had better, therefore, be filled up and done away with.

Respectfully yours.

F. C. CURTIS.

REPORT

ON

West Albany Car Shops of New York Central Railroad.

ALBANY, *October* 8, 1889.

TO CHARLES M. BISSELL, Esq., *Superintendent of the New York Central and Hudson River Railroad:*

DEAR SIR.—I inclose a copy of Professor Brown's report to me on his inspection of the shops and yards at West Albany, and invite your attention to the recommendations made therein.

As far as I could learn there have been in the past month and a half about 300 to 400 cases of a fever, called by the attending physicians "typho-malarial," among the operatives and employés of the railroad at West Albany.

Careful investigation of the disease gives the conclusion that two poisons were active in causing the outbreak — poisoned well water and poisoned air from sewer gas. Some of the cases were true typhoid, but the majority were of such a nature as could not be definitely classed except in so far as impure air brings about just such disturbance of the system as was noted in these cases. In all, twenty-three to twenty-six deaths are reported.

The report of Mr. Brown justifies the conclusions regarding the nature of the sickness. The ground, originally a swamp, is not properly drained, and the season being unusually rainy, no chance was given the leakage from drains and sewers or from privy vaults to be absorbed by the soil, it being saturated with moisture, and consequently the full force of the sewer gas was discharged wherever openings could be found for it, *i. e.*, wherever untrapped

drains or pipes existed, or where ground passages led to the surface.

To the saturation of the ground must be attributed the reason why a similar outbreak did not take place in former seasons.

It is recommended that:

First. Subsoil drainage be attended to all over the yard, but especially around the shops.

Second. That the drains be put in order, the suggestions of Mr. Brown be carried out, and that proper traps be placed wherever any connection is had with the sewer.

Third. That the drinking water furnished from wells being at all times of doubtful purity, proper filters be placed in the yard, and the men required to use the city water. It is suggested that all the water furnished to the shops or to the yard in general could first be passed through such a filter as the "Blessing" or the "Hyatt" and then distributed wherever needed. In this way the water drawn from any penstock would be fit for use.

Fourth. That the main sewer be carried out as a covered sewer in the lower part of the yard. The standing of cars loaded with dressed meat opposite this open sewer ditch in summer, is a matter of questionable procedure. The chance of disease germs being carried by the air to the meat in these cars should not be given. Therefore, for that reason and others the open sewer ditch should be closed.

It is further suggested that work be immediately begun to better the sanitary condition of the shops and yards. It is further stated that this letter is but suggestive and advisory. It is not ordered or directed by this board that the railroad authorities carry out the suggestions made. The fact that men employed by the road are made ill, and many have died by reason of the insanitary condition of the shops and grounds where they are compelled to work, is considered sufficient notice for the road authorities to remedy the matter.

Very respectfully, your obedient servant.

LEWIS BALCH,
Secretary.

UNION COLLEGE,
SCHENECTADY, N. Y., *October* 7, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health:*

DEAR SIR. — On September twenty-sixth I visited the car shops of the New York Central and Hudson River railroad, at West Albany, in company with Dr. F. C. Curtis and Health Officer O'Brien, and again on October fourth in company with yourself. I found the following unsanitary conditions, and would present the accompanying recommendations for their improvement. While I can not say, with our present knowledge of the circumstances, that the course recommended will absolutely prevent further outbreaks similar to that now in progress, I believe that a thorough application of the principles on which the recommendations are based will improve the sanitary condition of the place, and have a beneficial effect sufficient to justify the expenditure necessary.

1. *Drainage.*— The shops are said to be built on an old marsh which has been filled in, with no special attention paid to a removal of the ground water. Should this ground water lie habitually within say two feet of the surface, its effect at times upon the health of the operatives in buildings above would probably be bad, especially in the neighborhood of sewer channels in the condition stated below. Our inspection failed to find surface indications of the swampy nature of the subsoil, except near the upper end of the shop grounds. They are here quite marked. But one of the buildings was spoken of as being damp by the superintendent. The condition of the atmosphere at the time of our visits precluded a personal determination in any case. A thorough draining of all parts of the grounds found on examination to be habitually wet within two or three feet of the surface should be accomplished and can be, cheaply, by the use of agricultural drain tile where the passages of heavy weights over them are so regulated as not to endanger the tile from crushing. The surface drainage is in many cases poor, especially where the roof water falls directly to the ground. Apparently this is in general due to neglect to keep the drainage channels clear. It should be carefully attended to, especially in portions of the grounds not reached by the subsoil drains. The subsoil drains must not be connected with the sewers, unless by means of catch basins and

deep seal traps, protected so as to prevent evaporation as much as possible, and so arranged as to admit of thorough inspection.

2. *Sewerage.*—The discharge from water-closets, the roof drainage from several shops and the surface drainage from a portion of the grounds are carried off by a main and a branch sewer. Some roof and surface drainage is said to be carried off in another direction with no sewerage. The main sewer is built of brick, extends from a point near the main chimney to a point in the freight yards north of the shops, and runs thence east along the tracks to a point near the Armour Icing Station, where it discharges into an open ditch. The branch sewer appears to be a wooden box, at least towards its upper end. That the sewer where built of brick is anything but tight is shown by the evidence obtained, that it is necessary to pump out the pits of the fly-wheels at intervals, and that much odor of sewage is found at times in these places. The former fact is also evidence of the presence of water in the soil near the surface. The wooden box of the branch sewer is certainly not tight. Such leaks of sewage would be dangerous in any soil, but are especially so when the subsoil water is confined and near the surface, as is the case in part here, since the pollution by the soluble organic matter is thus more rapidly disseminated and has less opportunity for oxidation and purification. The sewers should be thoroughly inspected and made tight — relaid if necessary— and any wooden lines should be replaced by brick or, preferably, vitrified salt-glazed pipe laid with cement. I found but one trap (on the office water-closet) on the branches of the sewer. There are connections with the sewer in several buildings, notably the freight shop and the machine shop, by which waste water from the sinks or taps is discharged. In the freight shop some of these waste pipes run into the leaders from the roofs, neither having traps. These leaders are within the building, and above the height of six or eight feet are of light material and are liable to leakage of gas. In the machine shop there is an opening between two stands of boilers for the reception of waste water connecting with the sewer without trap. At this shop the rain-water leaders noticed were outside but were of light material. All these untrapped connections serve as ventilators to the sewer and, notwithstanding the frequent openings to the surface along the sewer, are the natural course of the sewer air, owing to

their being higher and, especially in winter, to the greater warmth of the buildings. This latter is true at all times of the opening spoken of in the machine shop. Other shops may have similar faulty constructions, but the proportion of men out in these two shops during the four days preceding our first visit was much greater than in any other of the car shops. All connections with the sewers should be effectually trapped in such manner as to prevent entrance of the gases into the buildings, and the ventilators should be carried three or four feet above the roof. As stated above, the surface drainage should be carefully taken care of and channels to openings into the sewer should be provided and be kept clear. An old privy at the south side of the grounds near the paint shop has been removed and the pit covered since our first visit. The pit should have been cleaned out before covering. The building was moved a few feet and set over a hole dug in the ground until clay was reached (four or five feet), no connection being made with any sewer. This hole is quite close to a water channel now discharging, I understand, into one of the city reservoirs. For this reason, but also on account of the nuisance to which it will eventually give rise, this procedure should be stopped and the use of the privy prohibited, or it should be made water-tight and a connection of the proper nature with the sewer be required. The ditch into which the main sewer empties is evidently quite a nuisance and a danger to health. The sewer should be continued down until it makes a junction with the city works below.

3. *Water supply.*—The shops are supplied with water by pipes, which draw partly from the city water supply and partly from a reservoir belonging to the company. I know nothing of the purity of the supply from this latter source. It should be investigated if its condition is not already sufficiently known to you. In summer the men prefer to use water from wells. Two have been so used. One has been closed by your orders, I believe, as investigation of its quality showed it to be in bad condition. The other is at a house on the north side of the yards — Mr. Cherry's. The privy vault is not more than forty feet from the well and is in a very filthy condition. From the statements of Mr. Cherry I inferred that the vault went down to a stratum of clay and that the well drew its supply from a vein of water below this stratum. It is quite possible that the well is not polluted by the vault, as

the drainage above the clay seems to be from the well towards the vault, and this idea is sustained by the statement made that in the shops whose operatives use this water there are no cases of the prevailing diseases. The vault is, however, a constant menace to the purity of the well water, should be removed to a greater distance, down hill, made water-tight and cleaned out at frequent intervals. The same would apply to other wells and privies in the immediate neighborhood, which are in similar condition.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

Report on Hudson River.

Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *January* 31, 1890.

Lewis Balch, M. D., *Secretary State Board of Health, Albany, N. Y.:*

Dear Sir.—I have the following report to make of our work thus far on the inspection of the Hudson river and its tributaries. This report is necessarily but a preliminary report, as the time at our disposal during the season was too limited to make more than a beginning, and the magnitude of the work is such that it can not be satisfactorily treated in the short space of one field season. I have continued the collection of data since the field season closed and am still at work on this line. One of the minor points for investigation has received sufficient attention to warrant a detailed report, which may be considered as final. This is the inspection of the numerous coves cut off, in whole or in part, by the railroad embankments from their connection with the river, and are thus given a tendency, more or less pronounced, to deterioration in condition, giving rise in many instances to considerable nuisance, and in others promising to do so if the exciting causes are not removed. Upon other branches of the investigation, such as the consideration of the various uses to which the river is put, such as for water supply, for ice, and as a carrier of sewage, I have a large mass of data, but the amount of information which must still be gathered is so great in proportion and it is so necessary to a good understanding of the subject that the information should be considered as a whole, that I have only attempted in this report to give an idea of the magnitude of the questions involved without giving much of the detailed information which I have on hand, reserving that portion of the subject until this information can be supplemented by future work, if the matter is deemed of sufficient importance to warrant further labor.

I will then give first the results of my inspections of the coves [illegible]. This inspection began at Yonkers and included both sides of the river, coves being cut off from full circulation by both the New York Central and Hudson River railroad and the New Jersey West Shore and Buffalo railroad as well as by the New York and New England railroad, the Hartford and Connecticut Western railroad and the [illegible] railroad.

Descriptions of each cove follow in order, beginning at the lower end and running up the east side and then up the west side. Sketches of many of them were made and accompany this report. They are arranged in approximately the same order as the descriptions, as nearly as the form and size of plates would allow. No great accuracy is claimed for these sketches as they are but field sketches based on a count of telegraph poles for length and estimates by the eye for breadth, except in case of the larger ones when such maps as were available were consulted. I am indebted to the United States Coast Survey and to the Corps of Engineers, United States Army for much information obtained from their maps of portions of the river. A number of photographs of typical coves and conditions of coves were taken. They are arranged in order of their numbers and are so referred to in the descriptions. The photographs are not reproduced for the printed copy of the report.

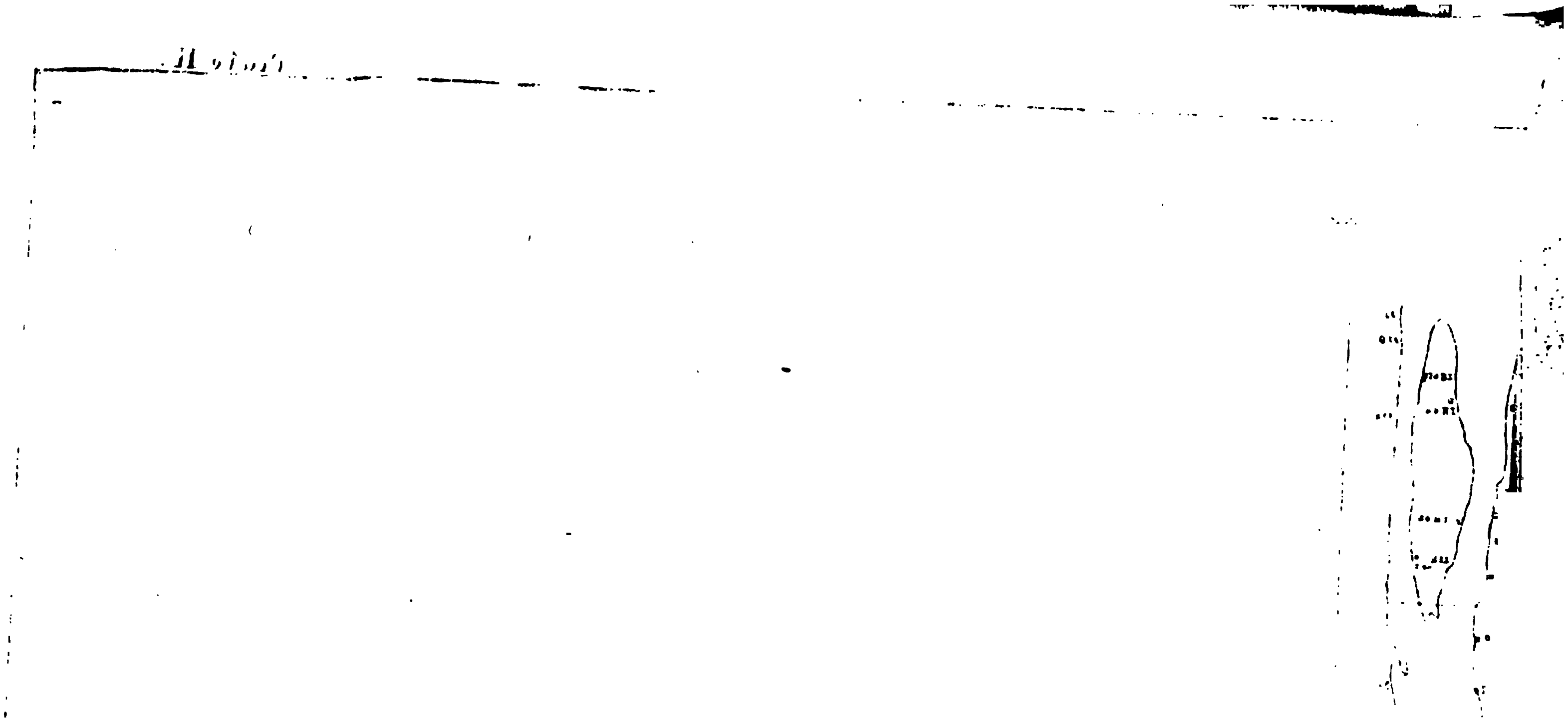
DESCRIPTIONS OF COVES.

EAST SHORE.

Between Yonkers and [illegible].

Bridge numbers on the east shore are those of the New York Central and Hudson River railroad.

Bridge 24 is near the middle of the length of a pond at the foot of a high bluff [illegible] near, about [illegible] feet long and perhaps [illegible] feet wide which is grown up with reeds. About 400 feet north of the north end is a storm-water channel down the bluff which discharges in part through an iron pipe culvert about the level of high water and in part along the track into the pond. Three or four feet of fill would obliterate the upper half of the pond, the portion in the worst condition because it has no circulation. Sketch on Plate III.



Bridge 37 is near the middle of the length of a pond at the foot of a steep hill, with a road running along its side part way up the slope. The pond is 1,500 feet long and perhaps 250 feet wide opposite the bridge, has a culvert of about fifteen feet span, is grown up with reeds and intersected by very narrow channels. A fill of about two feet would raise most of it above ordinary tides. Sketch on Plate III.

Bridge 39 is a seven-foot culvert, the outlet for a small brook from the hill, and high tide backs up over a space about 400 by 30 feet, perhaps two feet deep, partly grown up with vegetation. Sketch on Plate III.

Bridge 40 is about seven feet span, and is the outlet of a pond about 400 by 50 feet, the southern end being cut off from the culvert except at high water by the higher ground of the northern portion, and stagnant. Probably gives rise to considerable nuisance at times, especially to the residents in a small house near. High tide barely covers the northern part, which is mostly covered with marsh grass. Should be filled. Sketch on Plate III.

Bridge 51, between Dobbs Ferry and Irvington, is a small culvert, the outlet to a marshy spot overgrown with rushes, which is about 400 feet long. High tide backs in one or two feet deep. No houses near. Sketch on Plate III.

Between Irvington and Tarrytown.

Bridge 62 is near the middle of the length of a pond about 700 feet long by 80 to 100 feet wide, which is dammed opposite the culvert, and is apparently used as a fish pond. Is somewhat grown up with vegetation, but is apparently never a cause of particular nuisance, if properly managed. Sketch on Plate III.

Bridge 64 is near the south end, and bridge 65 is near the north end of a pond about 1,500 feet long and 300 feet or so wide just below Tarrytown station, which is bare at low tide. The upper end is being filled by refuse from the village. Considerable garbage has been dumped there and has given rise to great nuisance, but the local board of health has taken measures to prevent this. The filling should be continued as rapidly as possible with good material. Photographs 16 and 17 were taken from the dump heap to show the condition of the pond a few minutes after low tide. Sketch on Plate III.

Between Tarrytown and Scarborough.

Bridge 74 is near the middle of the length of a pond all above the level of low water, about 800 feet by 800 feet, and nearly triangular in form. The bridge has two spans of about fifteen feet each, and gives a fair circulation, but as about half the area is grown up with vegetation, there is probably considerable odor when decay sets in. A dam at the rear makes a fish pond out of the small creek tributary. Photograph 18 shows the greater portion of this cove. Sketch on Plate III.

Bridges 75 and 76 are respectively near the north and south ends of a pond about 1,100 feet long, which apparently has a good circulation of water through the two culverts each about fifteen feet span, except that the northern culvert is cut off from the pond during the lower two-thirds of tide, by a sand and gravel bank in front of it. If this were cleaned out, there would probably be no trouble at any time from the odors of decaying vegetation, of which there is but little, until the bottom of the pond is raised appreciably by deposits from the hills. The pond is at the foot of a bluff with houses above. Sketch on Plate III.

About 700 feet below bridge 77 is a very small culvert with small pond about 175 feet long, bare at high tide and grown up with marsh grass.

Bridge 77 is near the south end of a pond about 500 feet long and 50 feet wide, which would be bare at low water if there were a free current through the culvert and the pond channels. The culvert span is six feet. There is a little marsh grass at the upper end, and the whole is in condition to produce some trouble in time. Sketch on Plate III.

Between Scarborough and Sing Sing.

Bridge 80 is in the upper third of a nearly triangular pond about 1,500 feet long and perhaps 750 feet wide, which is quite clear of vegetation and nearly all covered at low tide. Two hundred and fifty feet or so north of the north end is bridge 81, the outlet of a creek. In times of high water this creek probably overflows into the pond through a low intervening space, grown up with weeds and somewhat marshy. This portion can easily be filled. The remainder of the pond has quite free circulation through bridge 80, which has three spans each about twenty-five feet. Should vegetation start in the lower end, and the circulation

become sluggish there, a culvert at that end would greatly aid in keeping the pond sweet. Sketch on Plate IV.

About 600 feet north of bridge 80 is a very small unnumbered culvert, the outlet of a small stagnant pond at the foot of a cliff which, if complained of, should be filled. Sketch on Plate IV.

Bridges 82 and 83 are outlets of small coves similar to the above, the upper one being used for a small-boat livery, and should receive similar treatment.

Mouth of Croton river.

Bridges 91, 92 and 93 are for the outlet of Croton river, which here spreads out over a great flat just below Croton point. Both within and without the railroad line the water is shallow over considerable spaces at low tide. The tidal currents are, however, fairly strong and remove to a great extent the products of decay of the aquatic vegetation which covers a large proportion of the area. This removal is not quite so complete behind the railroad embankment, owing to the checking of the currents and their concentration in particular channels by the bridges. There does not seem to be much ground for complaint of the condition of the river mouth at present, but the northern portion within the embankment has less circulation and more vegetation than the rest and may in time give rise to some trouble. If bridge 93 were larger, or if there were another bridge still further north, the circulation in this portion would be improved somewhat and the rate of deterioration diminished or removed. If bridge 92 were of longer span, the present fair condition of the south end would last for a much longer time. The condition of that end is apparently slowly deteriorating. Photographs 20, 21, 22 and 23 were taken here. Sketch on Plate VI.

Between Croton and Oscawana.

Bridge 95, and the ponds to which it is the outlet, are quite fully described in the report of the State Board of Health for 1884, page 397. There has been but little change in their condition since that report was made. It is a short distance south of the station at Croton. Sketch on Plate IV.

Bridges 106, 108, 109, 110 and 112 are all small culverts, outlets to small ponds 150 to 500 feet long, in which the circulation is poor owing to the condition or elevation of the culverts. The

culverts should be cleaned out and deepened to give free circulation at all stages of tide, and then, owing to the location, it will probably not be necessary to fill the coves for a long time. It will be necessary to leave some of these culverts for surface drainage or the best treatment at this time for all would be filling. Sketches on Plate IV.

Above bridge 112 and just below Oscawana station is a cove about 700 feet long and perhaps 400 feet wide whose outlets are two very small openings which seem to have been covered over on the river side so that most of the circulation in the cove is by percolation through the bank. The water is deep enough to prevent the growth of vegetation over most of the area, but the gradual process of filling to which almost all of these coves are subject will finally reduce the depth sufficiently to enable the growth and decay of vegetation to produce some nuisance. An ample opening to give a free circulation would probably delay this process indefinitely. A small brook runs in from springs on the hill. Sketch on Plate IV.

Bridge 113 is just below Cruger's station and the cove to which it is the outlet is connected by a ditch behind Oscawana island with a cove with no outlet, just above Oscawana station. These coves were examined and reported on in 1881. (See second annual report, page 296.) The recommendations there made regarding a dam at bridge 113 have been partially carried out, but the gates there provided in the dam are now apparently neglected, and the only effect seems to be to restrict the circulation and so to increase the nuisance. A ditch connects this cove with the one on the south of the island, as noted above, but is so small and obstructed that the circulation is anything but free, and consequently the lower cove, having no direct outlet to the river, is quite stagnant. A dike cuts off the southern end from what little circulation there is in the northern portion. Photograph 19 shows the portion of this cove next the railroad track. No culvert has been made in the railroad, as recommended in the former report. The cove described above as just below Oscawana station was included in the said report. Its culvert has been dammed as there recommended, but so effectually that it now has almost no outlet. As in most of the coves, it is here impossible to prevent the growth of aquatic vegetation without filling to a level above high water, and when this is not advisable on account of the

great expense, the next best thing is to secure as free a circulation as possible by large and unobstructed openings connecting directly with the river. The advisability of this course is shown in several instances by the differences in condition of contiguous shallow portions of the river outside the embankment in free circulation, and inside where the circulation is restricted, and also in the difference in condition of coves otherwise under practically the same conditions, but the one having a wide, free opening and the other a narrow or an obstructed opening. Sketch on Plate V.

Between Peekskill and Garrisons.

Bridge 124 is a short distance south of Peekskill station, is about eighteen feet span, and the outlet of a cove bare at low tide, and covered with a heavy growth of a light grass. The cove is shut in by bluffs on the sides, extends 500 or 600 feet back from the river as a marsh, and there receives a small creek and probably considerable flood-washings. The cove is the upper end of an arm extending up from the river, and probably never had very much circulation. What little it had is now practically destroyed, and there seems to be no way of remedying the present condition but filling. There are some houses near by and upon the tributary creek, so that there is doubtless sewage pollution entering the cove which will increase in amount as population increases. The cove has all the indications of being a first-class nuisance at certain seasons. Sketch on Plate IV.

On the upper edge of the village is a small pond cut off entirely from the river. The pollution it receives from the road drainage and house or factory near are making it an objectionable feature, and it should be filled. It is 300 to 400 feet long and about 100 feet wide. Photograph 15 was taken at its upper end. Sketch on Plate IV.

Bridge 127 is at the mouth of the Peekskill. The stream discharges into a great bay, across the mouth of which the railroad runs. The bridge has altogether about 400 feet opening, and probably does not restrict the circulation enough to affect to any great extent the character of the marshy tract on each side of the creek for some distance above its mouth, which is a half mile or more above the bridge. This tract is very large, and no reasonable amount of money would have any great beneficial effect upon it.

Bridge 129, of about five feet span, is near the center of a cove about 1,000 feet long and 200 feet wide. Consequently the circu-

lation is poor, and the shallow portions of the cove are filled with vegetation, much of which must decay and remain on the spot. The absence of any dwellings near renders its improvement of secondary importance. Sketch on Plate V.

Between bridges 129 and 130 are five small pockets or coves entirely cut off from the river, of which the same may be said.

Bridge 131 is at the south end of a large swamp from 250 to 350 or 400 feet wide, which extends about one and one-half miles along the track both ways from Highland station. Some houses are located on the opposite side of the marsh from the river and the station. Most of the ground of the swamp is covered at high water, and probably nearly all is bare at low water. The culvert is but fifteen feet span, and therefore the circulation, even near the outlet, is not good. However, the density of the swamp growth is such that little effect would be produced by increasing the opening. The location of the swamp at the foot of a high steep hill is at some distance horizontally and vertically from any dwellings except the few near the south end. Bridge 132 is a little north of the middle of the swamp.

Bridge 133 consists of two iron pipes, and is the outlet of a small brook from the mountain, forming a marshy spot about 500 feet by 150, remote from dwellings. Sketch on Plate V.

Bridge 135 is near the mouth of a cove about 1,100 feet long and up to 200 feet wide, which is well covered with water at high tide and which has a fair circulation. The span of the culvert is about twelve feet, and it is better proportioned to the amount of water to be changed than many, though it is all below high water mark. There is a house on the bank and there are others on the road 800 to 1,000 feet away and up the bluff. Heavy growth of grass in northern portion. Sketch on Plate V.

Two ponds between bridges 135 and 136 have their circulation nearly cut off by the embankment, here of porous material with no culvert; are small, and should be filled if they are sources of nuisance to any one.

Bridge 137 is near the north end of a cove about 1,300 feet long and perhaps 250 feet wide. The culvert has only about five feet span and gives less circulation than is desirable in the shallow portions where heavy vegetation grows. The spans of culverts are not designed with any direct reference to the amount of water which must flow through them during the rise or fall of a tide, to


SKETCHES of COVES,
East Shore of Hudson River

thoroughly change the water, while, evidently, they should be so designed in all cases where filling is not interded at an early date. Sketch on Plate VII.

Bridge 139 is at the extreme upper end of a marshy spot, bare at low water, and is the outlet of a small brook. The swamp is malarial, has very poor circulation of water during the tidal flow, is grown up with grass and should be filled. Marsh about 800 by 100 feet. Sketch on Plate VII.

Between Garrisons and Cold Spring.

Bridges 144 and 145 are south of Constitution island and bridge 146 is north of it. They are all outlets of the same great cove, which is a great swamp from a line near the back end of the island to the mainland. Bridge 144 is about twenty feet span, 145 about 240 feet in all, and 146 about 225 feet in all. There is a large space of free and open water along the railroad embankment. The condition of the swamp could be greatly improved by ditches dug deep enough to be below low water level and sufficiently numerous to carry off the water rapidly when tides fall. Cold Spring station is at the northern end of the open water and the foundry is along the edge of the swamp. Photographs 24, 25 and 26 were taken from a point between the station and the foundry. Sketch on Plate VIII.

Between Cold Spring and Dutchess Junction.

Bridge 147 is near the middle of a cove about 1,500 feet long and 300 feet wide, deep enough, except along the edge, to prevent the growth of vegetation, with good circulation and no apparent liability to nuisance except possibly in a small portion at the north end. The bridge has in all about fifty feet opening. Sketch on Plate VII.

Bridge 148 is near the north end of a pond about 800 feet long and 150 feet wide at the outlet of a creek. A culvert under a side track connects the pond with the creek outlet. The culvert under the side track is partly filled with quarry refuse and slag, and the main culvert is bare at low water. The circulation is consequently poor and the pond needs a culvert at its lower end and cleaning out and deepening of the present culverts to give a good change of water with every tide, unless early filling of the whole is intended Some houses along the bank increase the necessity of

this course by reason of the pollution of the pond which they cause. Sketch on Plate IX.

A pond above bridge 148, and just below Breakneck tunnel, has no apparent outlet, is partly filled with refuse from the quarry above and should be completely filled. Has some growth of aquatic vegetation, which will become more rank as time passes. Sketch on Plate VII.

Bridge 149 is near the middle of a cove about 500 feet long and 100 feet wide, mostly grown up with grass and uncovered at low tide. It should be filled, leaving a drain for a run from a small ravine. The span of the culvert is about seven feet. Sketch on Plate VII.

Bridge 150 is an eight-foot culvert all above low water, the outlet of a small creek with a small swampy place about 150 feet long, by 60 to 75 feet wide, with three or four houses about. Can easily be filled, leaving channel for stream, whenever it becomes disagreeable.

Bridge 151 is a ten-foot culvert, near the middle of a swamp about 900 feet long and 150 feet wide, which was quite odorous on the day of our visit, from decaying vegetation and stagnant water. Should probably be filled. There is a road along the bluff ten to thirty feet above the pond. Sketch on Plate VII.

Bridge 152 is a twelve-foot culvert near the middle of a pond about 1,600 feet long and 150 to 200 feet wide, in which the circulation is quite good near the culvert and quite poor near the ends where the water is stagnant. Culverts at the ends of sufficient opening to insure the changing of the water at each tide, will probably improve the condition of the pond and keep it in fair condition. Sketch on Plate IX.

Bridge 153 is a fifteen-foot culvert near the middle of a pond about 700 feet long and 175 feet wide, covered with a thick growth of grass, whose decay gives rise to considerable odor. A brick-yard and privy add some pollution to the pond. The water, except near the culvert, is covered with algæ. The only complete remedy is filling, though better circulation will do something towards its improvement by removing the products of decay. Sketch on Plate IX.

Bridge 154 is the outlet of a stagnant ditch thirty feet wide, from the remains of a swamp which has been nearly filled by the brick-yard adjoining. The whole should be filled, leaving a small

paved channel for the creek, and the privies should be removed from the bank of this channel. Sketch on Plate IX.

Bridge 155 has over 200 feet length of opening and is near the south end of the cove into which the Fishkill enters. Bridge 156 is a little north of the middle of the same cove and has an opening of about sixty feet. There is considerable marshy ground both inside and outside the railroad embankment, and the portion within is in but little if any, worse condition than that outside, the circulation of water being fair and checked but little by the embankment, owing to the size of openings and the flow of the creek. Great care should be taken to keep sewage out of the creek. When the cove fills with deposits sufficiently to render the circulation through the vegetation sluggish, it should be ditched to give as free a flow of water to all parts of the swamp as possible and opportunity for frequent removal of the products of decay. Photographs 13 and 14 were taken from the abutment of bridge 156. Sketch on Plate IX.

Bridges 157, 158 and 159 are in front of brick-yards near the southern edge of the village of Fishkill-on-the-Hudson. Outside of the embankment of the New York Central and Hudson River railroad is a trestle of the New York and New England railroad in process of filling. The effect of the two embankments on the numerous bits of water inclosed between them and the shore is very bad. The pond to which 157 is the outlet has almost no circulation through the ten-foot span of the culvert, owing to its small size and obstructed condition. It empties into a pond inclosed between the New York Central railroad embankment, a trestle of the New York and New England railroad, a dock and the shore of Dunning's point. The New York and New England trestle is in process of filling and will render the two ponds just mentioned two stagnant ponds of sufficient size and with sufficient pollution from the brick-yard buildings and village streets and houses to become great nuisances. If the New York and New England trestle is to be filled, as is probable, the space between the embankments of the two railroads should be filled at the same time. The pond behind the New York Central railroad should be filled in any case. Adjacent to this latter on the north is a small pond which may be a pit from which clay has been dug, or which has been cut off from the other by a roadway filled in, and which has no outlet other than a blind drain. Its con-

dition and possibilities require filling. Bridge 158 is over a passage-way from the brick-yards to the docks. Bridge 159 is the outlet of a pond behind the New York Central railroad, which is marshy and the water is covered with an offensive growth of algæ, producing at times much nuisance. The outflow is into a second pond between the two railroads, adjacent to the one above described and separated from it by docks. The New York and New England embankment greatly obstructs the flow of water, especially as the small culvert left in the bank is very much obstructed with stones and earth. The only remedy for these two ponds, as for the other, is filling. The openings left are altogether too small, and the passage of water is too much restricted to keep the ponds sweet, and as they are close to the village, the nuisance to which they give rise is too noticeable to be continued. Sketch on Plate X.

Between Fishkill and New Hamburgh.

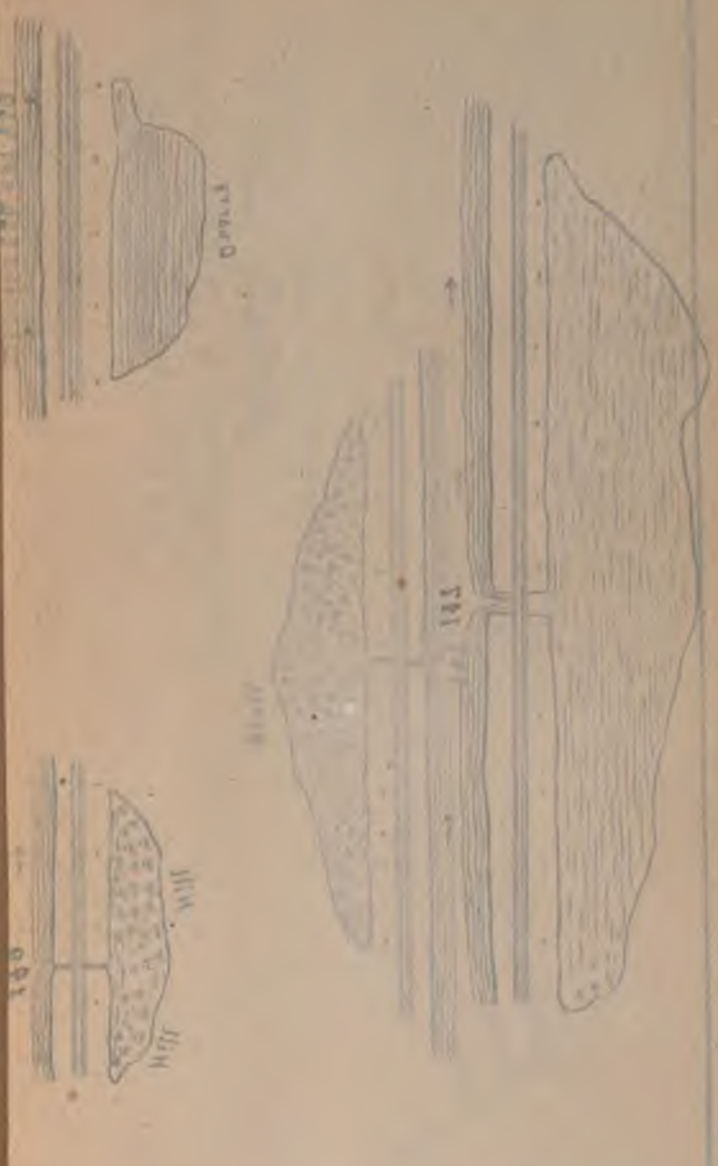
Bridge 162 is a small culvert of two feet span, the outlet of a small marshy spot, 400 feet by 25 feet, with little circulation owing to small size of culvert and obstructions from logs, stumps, etc., which should be filled if source of complaint to any one. The cove is at the base of a wooded hill. Sketch on Plate X.

Bridge 164 is a culvert of seven-feet span, the outlet of a swamp about 800 feet by 60 feet, whose circulation is fair at high tide, but the water is covered with a growth of algæ which indicates that the change of water is far from complete. Sketch on Plate X.

Bridge 165 is a culvert of four feet span, the outlet of a cove about 900 feet by 60 feet, in which the circulation is poor, the water being covered with green slime and weeds. Water is four feet deep at high tide at the culvert. Should be filled if cause of complaint. Sketch on Plate X.

Bridge 166 is a culvert of five feet span, the outlet of a small creek from a wooded hill and a cove about 400 feet by 30 feet which is covered with weeds. Can readily be filled. Sketch on Plate X.

A thousand feet or so north of bridge 167 is a small culvert, the outlet of a cove 500 feet by 70 feet, at the foot of a wooded hill and just north of a brick-yard. The culvert is too small to give an appreciable circulation to the water, and it is in receipt of pollution from hill and brick-yard, so that it is stagnant and filled with weeds and should be filled. Sketch on Plate X.



is not of much use to the swamp. The swamp is about 250 feet by seventy-five or eighty feet, and should probably be filled as there is considerable odor at times from decaying vegetation, giving rise to nuisance. Sketch on Plate XI.

Bridge 180 is a culvert of six feet span, above the level of low tide, the outlet of a swampy spot all above low tide, and some above high tide. The swamp is about 500 feet by 40 feet, is filled with weeds and algæ, whose decay gives rise to disagreeable odors, and it should be filled. A house is near the bank. Sketch on Plate XI.

Bridge 181 is a bridge of twenty feet span, the outlet of a cove about 900 feet by 60 feet with hardly any circulation, covered with weeds and algæ, and with a decided swampy odor. Part of the pond is bare at low water. Houses near probably add pollution and the place is probably at times quite a nuisance, which can only be completely removed by filling. Sketch on Plate XI.

Bridges 182 and 183 are outlets of a swamp about 1,300 feet by 300 feet. Bridge 182 is about sixty feet span and the water in its neighborhood is two to four feet in depth, but filled with weeds. Bridge 183 is about ten feet span and the culvert bottom is bare at low tide. There are a few channels through the pond, from five to fifteen feet wide, full of weeds, and the rest of the swamp is above the general water level and grown up with tall rank grass. The banks along the northern side are wooded. Full opportunity for change of water should be given by larger openings through the embankment, or better still by more of them. Sketch on Plate XI.

Bridge 184 is about seven feet span, all above low water, the outlet of a pond about 500 feet by 30 feet, at the foot of a wooded hill, with little circulation, full of weeds and covered with algæ. No houses are near. If it is a source of complaint, the nuisance it creates can be best abated by filling. Sketch on Plate XII.

A short distance south of bridge 185 is a pond about 500 feet by 30 feet, with no outlet and apparently deep and free from vegetation, and not productive of nuisance at present. The water probably circulates through a porous embankment. Sketch on Plate XI.

Bridge 185 is about six feet span, all above low tide and the bottom but little below high tide, the outlet to a swamp about 250

feet by 70 feet with little circulation, covered with weeds and algæ, especially in the south end. Several houses near probably add pollution. It is probably quite a nuisance at times and should be filled. Sketch on Plate XII.

Bridge 186 is about five feet span and is at the north end of a end of pond about 800 feet by 100 feet, with little circulation, covered with algæ and quite weedy. Is probably a source of nuisance from decaying vegetation and the southern end at least should be filled, the remainder being either filled or furnished with a larger opening. The north end is partly uncovered at low tide. A boat-house stands on the bank. Sketch on Plate XII.

Bridge 187 has a span of about sixty-five feet, and is the outlet of a cove about 1,700 by 400 or 500 feet, which is covered with weeds, with good circulation of water near the bridge and poor circulation at the ends. Along the bank opposite the bridge is a swampy portion slightly above ordinary stages of water, and grown up with tall reeds. A house stands above the pond on a hill. The pond apparently needs ample culverts at points near the two ends, to insure good circulation, and the insertion of these will probably prevent its becoming a great nuisance for some time. Sketch on Plate XII.

Just south of Camelot station is a pond about 500 feet by 90 feet, apparently deep and without vegetation. It has no apparent outlet, but there is probably some circulation through the porous railroad embankment. It is at the foot of a rather steep wooded hill. In the course of time the filling up of the pond by washings from the bank will decrease the depth sufficiently to permit the growth of vegetation and will in time produce a nuisance. Probably a trestle was formerly here, which has been filled up at a comparatively recent date, as have been others just above Poughkeepsie. Sketch on Plate XI.

Bridge 189 is just north of Camelot station. It is six feet span, and is the outlet of a creek which widens out just above the culvert into a marshy spot about 125 feet by 50 feet, which has a bad odor in hot weather. The bottom of the culvert is about on the level of low water. A mill stands near. If the swamp is filled, leaving a channel for the stream, the present nuisance, such as it is, will be abated.

Just above bridge 189 is a small stagnant pond about 150 feet by 40 feet, with a barn on the slope above it. It has no culvert, and should be filled. Within a half mile north are three other

similar small ponds without culverts, in similar condition, except as to drainage from barns.

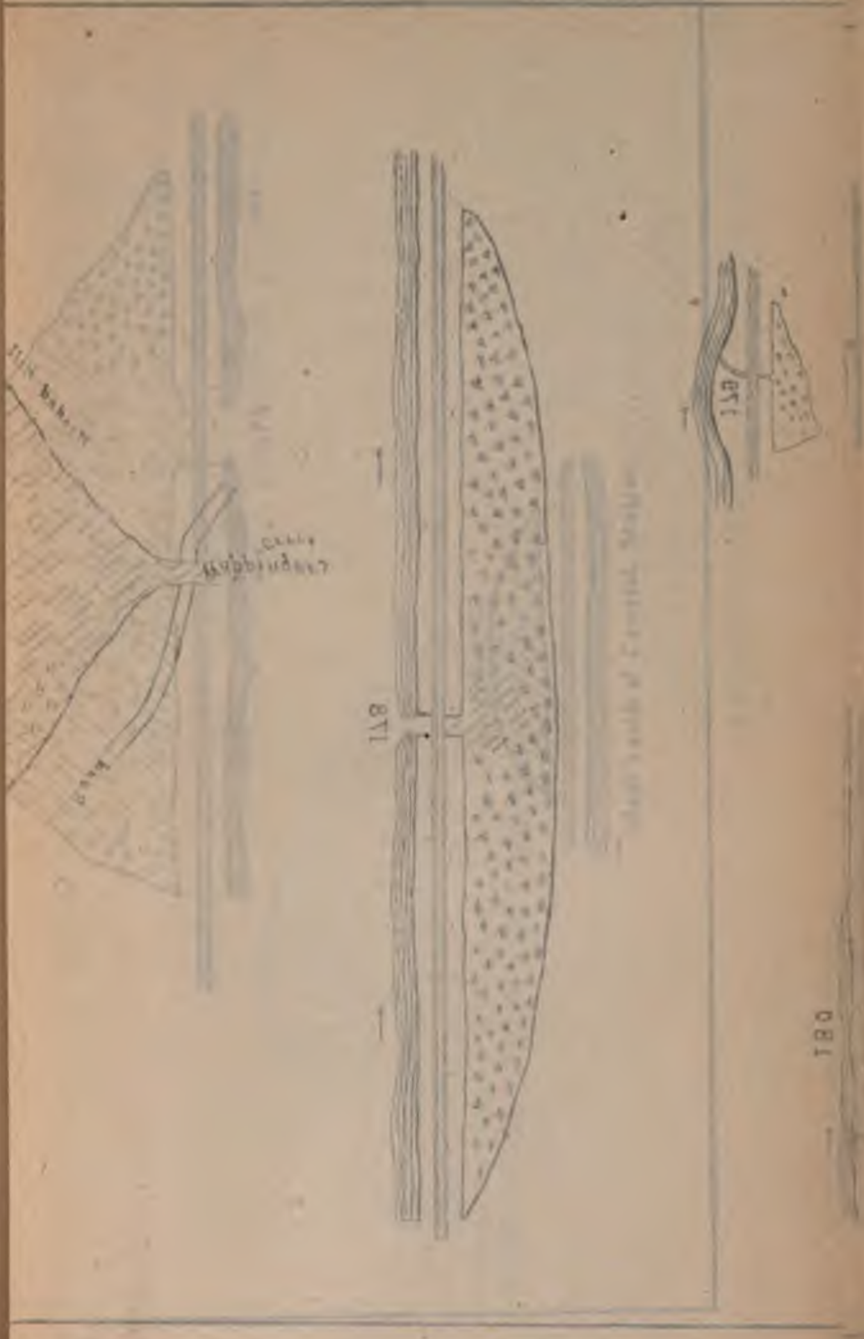
Just above the tunnel below Poughkeepsie is a pond about 300 feet by 200 feet, with no outlet, but apparently with some circulation through the railroad embankment. This is, of course, not sufficient to remove the products of decaying vegetation, of which there is considerable. Some surface drainage enters through a swampy corner. Six hundred or 800 feet north is another clear and apparently deep pond about 250 feet by 150 feet, with no outlet, which may become a source of nuisance in time by reduction of depth, but it is not now. Sketches on Plate XII.

About a half mile south of bridge 192, is a pond with no outlet, 500 by 200 feet, with marshy edge on one side, which receives some surface drainage, and has slight circulation through the embankment. Has considerable eel-grass growing in it and will become in time quite a nuisance if it is not filled or an adequate culvert inserted to insure the removal of the products of decay by frequent complete change of water. Sketch on plate XII.

Perhaps 1,000 feet north of the above, is another with steep banks and of larger size, 1,600 feet by 200 feet, which has no culvert but has some circulation through the porous embankment, and has some vegetation growing in it. While in no bad condition now, the lack of opportunity for removal of the products of decay will ultimately allow the production of a bad condition, the arrival of which will be hastened when the porosity of the bank is diminished by slimy deposits on its face and in its interstices. Two or three culverts, designed to be of sufficient water-way to insure complete change of water at each tide, will postpone the time when a nuisance will be created, indefinitely. Two or three small culverts are better than one large one, as the water at the extreme limits will then have a less distance to travel, and will be more affected by the concentration of the currents through the culverts. Sketch on Plate XII.

Bridge 192 is over a roadway. On the river side of the embankment near the bridge, is a stagnant pond about 200 by 75 feet, cut off by a roadway between two sections of the Phœnix Horseshoe Company, just below Poughkeepsie, with a culvert whose bottom is nearly up to high water. The pond is source of nuisance, and should be filled. Sketch on Plate XIII.

Bridge 194 is the outlet of a swampy place about 250 by 150 feet, barely above high water, whose drainage is not materially



affected by the railroad embankment. It receives at times drainage and probably some sewage from houses in the city of Poughkeepsie, through a ravine, and should be filled somewhat, leaving a channel for the passage of the drainage mentioned.

Between Poughkeepsie and Hyde Park.

Bridge 213 is a culvert of ten feet span, the outlet of a marshy spot about 300 by 80 feet, at about the level of high water. A slight fill, leaving a channel for the surface drainage from a small water-course, will be sufficient to render it always dry. A small pond, 100 by 30 feet, outside the railroad embankment, is cut off from the river by the road to the insane asylum waterworks, which goes under bridge 212. This pond has no circulation and should probably be filled. Sketch on Plate XIII.

Bridge 214 is a small culvert of four feet span, almost entirely above high water, the outlet of a pond nearly 300 feet long and 180 feet wide. Possibly a little water runs in and out through the culvert at and near high tide, and the circulation is very poor, causing the pond to be in bad condition, with flags, lily-pads, eelgrass and algæ in abundance. The pond receives some surface drainage, but no regular supply. A deeper outlet would be of great help in restoring the pond to good condition, but the best remedy is filling, if it is near enough to any one to call attention to its condition. Sketch on Plate XIII.

Bridge 215 is an old trestle, which is in process of filling with porous material, leaving no apparent opening. There is a little circulation through the embankment. The pond has very steep banks with almost no surface drainage entering it, is filled with vegetation and has the possibilities of considerable nuisance. It is over 500 by 120 feet; has been complained of by people living above, and should be filled to a point above low water. Photograph 29 was taken here. Sketch on Plate XIII.

Bridge 216 is an old trestle in process of filling, as is 215. It is in worse condition, but is smaller, being about 300 by 100 feet, and should receive the same treatment. Sketch on Plate XIII.

Bridge 217 is a culvert of twelve feet span, the outlet of a brook and a pond over 500 by 160 to 240 feet, the northern half being grown up with aquatic vegetation, subsurface, and covered with algæ, and the southern half with grasses. The pond probably becomes a nuisance at times. Another culvert would improve the

condition of the northern end. The southern end would be best treated by filling. Sketch on Plate XIII.

Bridge 218 is a culvert of about twelve feet span, the outlet of a cove about 2,400 feet long and 350 feet wide, with steep high banks and a drainage channel entering at the upper end. There is probably considerable percolation through the bank, but the water is covered with greenish and yellowish-green algæ. The present culvert is evidently too small to give anything like good circulation, and at least two more culverts are needed near the ends, these to be of sufficient water-way to give a good change of water with each tide. Sketch on Plate XIII.

Bridge 219 is a culvert of about seven feet span, the outlet of a cove about 900 by 30 to 100 feet, which is principally a swamp, afloat at high tide and with little or no water at low tide. The best treatment for this case is probably filling. Sketch on Plate XIII.

Bridge 220 is a culvert of six feet span in which the water is about one foot deep at ordinary high tides. The water in the pond is consequently stagnant, but little of it is changed and its surface, where not grown up with weeds and grass, is covered with a thick greenish scum of algæ. It is doubtless a nuisance to houses near and should be filled. About 500 feet long by 80 feet wide in the widest part. Sketch on Plate XIII.

Between bridge 221 (an overhead bridge) and Hyde Park are four ponds with no culverts. The first is just above bridge 221, about 150 feet by 30 feet, apparently deep, comparatively clear water, with some percolation through the embankment. The second is just above Greer's Point, is about 800 by 75 feet, clean and clear, with the exception of some brown patches of algæ floating about. A deserted house and barn are at the north end. Should be filled if it is ever cause of complaint. Photograph 10 was taken here. The third and fourth are just below Hyde Park station, are quite small and dirty (one having a privy on its bank), and should be filled.

Between Hyde Park and Staatsburg.

Bridge 223 is a three-span bridge over the mouth of a creek just above Hyde Park station, with about eighty feet of opening, of no special obstruction to drainage. Some dark green algæ were floating on the surface. Care should be taken to keep sewage out

of the creek, as its deposit at or near the mouth of the creek is very liable to create nuisance. The appearance of the banks and bottom indicate some such pollution of the creek at present.

About one-half mile north of Hyde Park station is a pond with no culvert and but little percolation through the bank. But little surface drainage reaches it, and it is shallow, filled with rank vegetation, and covered with algæ, producing considerable nuisance at times. It should be filled if complaint is made of it. About 250 by 80 feet, with steep sloping banks. Photograph 11 was taken here. Sketch on Plate XIV.

Bridge 226 is of eight feet span, near the south end of a pond 500 by 100 feet, which is nearly bare at low tide. The pond is grown up with rank vegetation. The culvert is obstructed at low water by gravel. The best condition could probably be obtained by filling, leaving sufficient slope or channels to collect the surface drainage now entering the pond, and deliver it at the culvert. Photograph 12 was taken here. Sketch on Plate XIV.

About 1,000 feet south of bridge 227 is a pond about 500 by 60 feet, with no culvert and with some percolation through the embankment. It is quite stagnant and quite well filled with subsurface vegetation, and a large part covered with green algæ. The banks are steep. If it is a nuisance to the neighborhood at any time, it should be filled. Sketch on Plate XIV.

Bridge 227 is the outlet of a ditch about 700 by 25 feet, through which water flows only at high tide. The ditch should probably be filled to the level of high tide.

Between Staatsburg and Rhinebeck.

Bridges 243 and 244 are the outlets of the head of Vanderberg's cove, above Staatsburg. Bridge 243 has three spans, with a total opening of about 100 feet, and 244 has an opening of eighteen or twenty feet. The cove is about three-quarters of a mile long and one-quarter mile wide; is of fair depth and in good condition generally. The bridges have not sufficient opening to insure anything like a thorough changing of water, and it is only a question of time until the condition of the cove will deteriorate sufficiently to cause considerable nuisance, as in the case of other large coves now under less favorable circumstances. The appearance of marshy borders along the banks shows the tendency of all such places to filling up with growths of vegetation and becoming

marshes. Outside the embankment we have a similar growth. The difference between outside and inside is only one of circulation, and it will be ultimately more economical to provide sufficient openings in area, distributed along the length of the cove to insure a good circulation and a fair amount of change of water at each tide, than to force the water to remain indefinitely behind the embankment, and so prevent the carrying off of the products of decay of the vegetation. In time the level of the bottom will be raised by the deposit of these materials and a swamp formed, as already indicated, and when this happens it will be an expensive proceeding to abate the great nuisance then in existence. Sketch on Plate XV.

Bridges 245 and 246 are outlets of a large cove about two miles below Rhinebeck station, which is nearly one-half mile long and up to 600 feet wide. Both bridges are north of the center of the cove and are fifteen to eighteen feet span. The cove is somewhat shallower than the last one described and is probably partly uncovered at low tide (visited at high tide). It will, therefore, come to bad condition earlier than that one and the same remedies of increased number and size of culverts should be earlier applied, but will probably not delay the production of a bad condition so long. A number of houses on the hills above would be affected by any considerable deterioration in the condition of the cove. Sketch on Plate XIV.

Bridge 247 is of ten feet span, the outlet of a creek and a pond 250 by 80 feet, grown up with lilies and other vegetation, and should be filled, leaving a channel for the creek. Sketch on Plate XIV.

Bridge 248 is of fifteen feet span, near the north end of a pond 700 by 150 feet, at the base of steep, wooded slopes, in which the circulation is very poor, the northern end being grown up with lilies and other vegetation. It is probably, at times, a nuisance to the inhabitants of the houses on the bank above and should be filled. Sketch on Plate XIV.

Bridge 249 is of ten feet span, the outlet of a pond about 900 by 100 to 150 feet, with steep banks, which receives but little surface drainage. The circulation is not very good and the pond is grown up with lilies in places. If such portions as are above low-tide were filled, the remainder would probably be small enough to have a good circulation through the present small culvert. Sketch on Plate XIV.

SKETCHES of COVES
East Shore of Hudson River
Approximate Scale

[illegible] along the shore to show the greater part of their [illegible] Sketch on Plate [illegible]

Bridge 252 has seven feet span, and is at the north end of a swamp about 250 by 50 feet, which is covered at high tide and [illegible] at low tide. It is grown up with grass and weeds and should be [illegible] Sketch on Plate XVI.

Just above this swamp is a small pond of stagnant water about 150 by 70 feet, with no outlet, which should also be filled.

Near bridge 253 is a pond about 500 by 50 feet, with no outlet, filled with dirty water, with but little vegetation. If a source of nuisance to any one it should be filled. Sketch on Plate XVI.

Bridge 254 is of eighteen feet span, and is near the south end of a cove about one-half mile long and one-eighth mile wide. The water is deep and generally free from vegetation. Another culvert or two, designed with reference to the amount of water to pass at each tide, would preserve the present good condition indefinitely. With the present comparatively small opening, it is but a question of time until the condition of the cove becomes bad. Sketch on Plate XVI.

Bridge 255 is of eight feet span, the outlet of a swamp about 500 by 70 to 100 feet at the foot of a gently sloping hill with houses above. The swamp is, most of it, above low water, and grown up with grass. It should be filled to an elevation above high water, with proper slope to take surface drainage to the culvert. Just south of a tunnel. Sketch on Plate XVI.

Bridge 256 is of ten feet span, the outlet of a pond about 1,400 feet long and 80 to 120 feet wide, with fairly good circulation and not much vegetation growing in it. It is just north of the tunnel above mentioned. Proper area of outlet, best obtained by an additional culvert near the south end, will probably keep the water in good condition for a number of years.

Bridge 258, of twelve feet span, is near the south end of a pond about one half mile long and 250 feet wide. The water is deep and has fair circulation near the culvert. Some greenish algæ were [illegible] at the south end, and there is some vegetation growing north of the culvert. Another culvert of ample waterway should be put in near the north end, as the present culvert is entirely [illegible] to give good circulation to all parts of the cove. At [illegible] wooded hill. Sketch on Plate XVI.

About 2,000 feet north of bridge 258 is a pond about 500 by 50 to 100 feet, which has no apparent outlet. The water is stagnant and dirty, and is full of weeds and covered with algæ at the southern end. A large culvert would probably give circulation enough to keep the water sweet, or the pond could be filled. At the foot of a wooded hill. Sketch on Plate XVI.

Bridge 260 has seven feet span, and is the outlet of a pond about 800 by 200 to 250 feet. The water is deep and free from weeds, but there was a considerable area covered with algæ. The pond is at the foot of a gently sloping meadow, and is not now likely to give cause for complaint. More ample openings to insure change of water, will preserve it in good condition indefinitely. The bottom of the culvert is above the level of low water. Sketch on Plate XVI.

Bridge 262 is of twelve feet span, and is the outlet of a creek and a pond about 800 by 225 feet, with deep water and no vegetation except at extreme north end and near the mouth of the creek. Light green or yellowish algæ cover the south end. The bottom of the culvert is above the level of low water. Better circulation through another culvert, and the present one deepened, will preserve the pond in good condition until the wash from the hills partially fills it. With the present opening a much shorter time will produce a bad condition. Sketch on Plate XVII.

Bridge 263 is of nine feet span and is near the south end of a pond about 1,400 feet long and 100 to 150 feet wide. There are a good many weeds in the pond, and it is nearly all covered with floating algæ, and it is likely to become a nuisance at times. The bottom of the culvert is above the level of low water. A more ample opening near the north end and a deepening of the present culvert will aid in keeping the place sweet. The southern end for about 500 feet had better be filled. Sketch on Plate XVII.

Bridge 264 is of twelve feet span and is at the north end of a swamp about 400 by 80 feet, grown up with weeds, lily-pads, etc., and covered with a thick layer of algæ. Some trees grow in the water also. It may be cause for complaint and can best be remedied by filling. Sketch on Plate XVII.

Bridge 265 is of four feet span, the outlet to a small creek which forms a marshy place about 300 by 100 feet, grown up with grass, reeds, etc., and should be filled, leaving a channel for the creek and surface drainage to reach the culvert. Sketch on Plate XVII.

Between Barrytown and Tivoli.

About 1,000 feet south of bridge 267 is a pond about 400 by 50 feet with no apparent outlet. The water is dirty, stagnant and full of weeds with quite a growth of algæ on the surface. The place is very probably a nuisance many times and should be filled. An outlet for surface drainage should be provided. Photograph 8 was taken here. Sketch on Plate XVII.

Bridges 267, eighty feet opening; 268, ninety feet opening; 269, forty feet opening, and 270, 450 feet opening, are the outlets of what is called South Bay, between Barrytown and Tivoli. The open water in the bay, behind the railroad embankment, is about one and one-half miles long and one-fourth to one-half mile wide. Weeds grow along the shore, which are covered at high tide. There is considerable odor at times of low tide from the decaying of this vegetation. The circulation is in general good. About 400 feet north of bridge 270 is Magdalen Island, which lies on the river side of the railroad, between bridges 270 and 271, about one-half mile. On both sides of the railroad, along this distance, is a swamp, that on the island side being about 200 feet wide. The swamp extends above bridge 271 about a mile and is from one-fourth to one-half mile wide. As outlets to this marsh there are bridges 271, seventy-five feet opening; 272, 350 feet opening; 273, sixteen feet opening; 274, thirty-five feet opening; 275, thirty feet opening. In front of the bridges is generally some open water, but the area is on the whole one great marsh, grown up thickly with vegetation. Photograph 9 was taken at the southern end of South Bay. The bottoms of culverts 273, 274 and 275 are above low water.

Between Tivoli and Catskill.

Between bridges 278 and 280 are a half-dozen small pockets from 100 to 600 feet long and twenty-five to fifty feet wide, which have no apparent outlets, are stagnant and covered with a thick scum of algæ. They should all be filled.

Between bridges 281 and 282 are two similar ponds from 300 to 500 feet long and twenty-five feet wide, without outlets, which could also be filled.

Bridge 282 is of fifteen feet span, and is near the north end of a pond about 300 feet long and about the same width, into which a small brook flows. The pond is partly grown up with grass and lilies and may, at times, be a nuisance to the people near. It is

on the lower edge of Germantown. Should be filled if complaint is made. Photograph 33 was taken here. Sketch on Plate XVII.

A short distance above this is another about 150 by 50 feet, with a small culvert two feet square. A house, barn and garbage-dump are on the bank. It is used as a duck pond, is deep and in good condition. Above this 1,000 feet or so, is another similar. Both can easily be filled if necessary.

Bridge 283 is of six feet span, near the south end of a pond about 500 by 150 feet. Most of the pond is shallow and grown up with grass and weeds, with some algæ. A small creek enters it. Houses surround the pond, as it is just below Germantown railroad station, and it should be filled when it becomes a cause of complaint, a channel being provided for the creek. Sketch on Plate XVII.

At bridge 284 is a small swampy place 100 by 40 feet at the mouth of a creek.

Bridge 286 is of four or five feet span, is the outlet of a pond about 500 by 200 feet, which has an abundant growth of eel grass. A deeper and larger culvert, or an additional one near the south end, would improve the condition of the pond by giving more thorough change of water. Sketch on Plate XVII.

About one-quarter mile below Germantown steamboat dock is a pond about 900 by 30 feet, with no outlet. It has steep cliff banks, and is grown up with vegetation of various kinds.

Just below the dock is another about 500 by 200 feet, with no outlet, but with some percolation through the embankment. A culvert of proper size would keep the pond sweet for an indefinite time. Sketch on Plate XVII.

Bridge 287 is of twelve feet span, the outlet of a pond about 1,700 feet long and 200 to 300 feet wide, deep and fairly clean. There are several houses at the south end. Two more culverts near the ends, of ample opening, would give much better change of water and would preserve the present condition indefinitely. Sketch on Plate XVII.

Bridge 289 is of eighteen feet span, the outlet of a creek and a pond about 1,400 feet long, and from 100 to 300 feet wide. The southern end is connected with the northern and the culvert by a narrow obstructed channel eight or ten feet wide, and is a pool of stagnant water, grown up with weeds and grass. The circulation throughout is poor and can not be improved greatly. The northern

portion is grown up with vegetation, and its decay produces a strong odor. Filling is the only adequate remedy. Photograph 34 was taken here. Sketch on Plate XVIII.

Bridge 290 is of ten feet span, and is at the north end of a pond 900 by 350 feet, which is grown up with lilies, grass, etc., and is quite stagnant. Additional circulation would probably not improve the condition of the pond much, as it is quite shallow. There is the same character of vegetation outside the embankment, but the circulation of the tides carries off the products of decay in large part, and prevents the production of so much nuisance as within the embankment, where there is almost no circulation. Filling is the only complete remedy for the pond, and should be resorted to if the pond is just cause of complaint, from proximity to dwellings or other reason. Sketch on Plate XVIII.

Bridge 291 has an opening of about 350 feet, and is the outlet of Livingston creek, just below Linlithgo railroad station. About half the water-way of the bridge is covered at low tide, and nearly all at high tide. A greater depth would improve the circulation through the opening somewhat. There are large, shallow tracts on both sides of the railroad, grown up with grass, etc. That inside is a marsh opposite and south of the bridge. Sketch on Plate XVIII.

Bridge 292 is a short distance above Linlithgo, and below the iron works, is of six or eight feet span, the outlet of a swamp about 1,500 by 60 to 100 feet, covered at high water and bare or nearly so at low water.

At the iron works is a cove surrounded by a trestle to the dock. This trestle is now filled part way round. Should it be filled much further, the cove should be filled also. Bridge 293 is the overhead bridge where the trestle crosses the railroad.

Bridge 295 is of thirty feet span, the outlet of a small creek one-fourth mile or so below Catskill. It is marshy on each side of the creek, the bottom is all bare at low tide, and probably but slightly covered at high tide. Houses and their outbuildings add pollution. The marsh should be filled to an elevation above high water, leaving ample channel for the creek. Sketch on Plate XVIII.

Between Catskill and Hudson.

Just above Catskill station is a pond about 1,200 by 60 to 75 feet, full of grass and subsurface vegetation, with no apparent outlet. There is probably some percolation through the bank. It

should be filled if there is any interested person to make complaint of its condition. Sketch on Plate XVIII.

Between the above and bridge 296 and between bridges 296 and 297 are three swamps behind the railroad embankment (one being at some distance from the river) which have no outlets. They seem to be formed by surface drainage, which is confined by the embankment, and, if so, small culverts at proper elevation will probably dry them out, with possibly some aid from ditches.

Bridge 297 is a box culvert of three feet span, but little, if any, below the level of high water. If deepened, it would perhaps empty the pond, which is about 700 by 100 feet, and a slight filling, with slope towards the culvert, would prevent its being a nuisance. No houses within 500 feet. Sketch on Plate XX.

Bridge 298 is the outlet of Hudson South bay and has an opening of about 150 feet. This bay has been reported upon before, and the report is printed in the third annual report of the State Board of Health (1883), page 229. There seems to be an additional railroad embankment across the bay now, almost at right angles to the river, with but one rather small and obstructed culvert, so that the circulation in the northern portion of the bay is very slight and the area is thickly grown up with tall grass and reeds. Considerable progress has been made towards filling up this portion of the bay, and the work should be continued as rapidly as possible. A small area still further north, behind the embankment of the Boston and Albany railroad, is also a source of nuisance from the house drainage settling in it, and should be filled. The southern portion of the bay has considerable open water in it. The swampy portions should be filled as rapidly as possible, after the filling of the northern portion is completed, leaving ample channels for the creek and for surface drainage. Photographs 3 and 4 were taken here. The city garbage dump is located only a short distance above bridge 298, and will be a source of some nuisance. The lighter portions of the garbage here dumped are met with in considerable quantities for a long distance down the river, and it is a source of considerable pollution to the water. There seems to be some attempt to empty garbage only at the times of high tide, thus causing most of the refuse to be carried down stream, so that it will not affect the city of Hudson. Sketch on Plate XIX.

Bridge 301, thirty-five feet opening, 302, sixty-five feet opening, and 303, 225 feet opening, are the outlets of the North bay, at

Hudson, which is about one and one-half miles long and one-eighth to one-quarter mile wide, on the northern side of the city of Hudson. There is an area in front of each bridge which is free from vegetation, and there is quite an area of open water near the south end, but much the greater proportion of the bay lies on a level between high and low water, and is grown up with reeds, grass, etc. It is, on the whole, in slightly better condition than South bay, but the sources of pollution mentioned below will reduce the bay to the same or a worse condition. There is quite a population near the southern shore, which directly pollutes the water, and in the midst of the houses on the bank is the outlet of a large sewer from the city, which discharges a large amount of pollution into the bay. The effect of this pollution upon the water and air is very sensible, and it should be stopped as soon as possible. Considerable amounts of the solid portions of the sewage are deposited on the bottom of the bay and among the roots of the vegetation growing in the swampy parts, giving rise to rank growths which retain considerable matter to give rise to much odor during low tides, when the ground in these portions is bare. A brewery and a factory add considerable pollution of different natures. Before the South bay is filled, at the present rate of progress, the North bay will require filling quite as much. Indeed, the southern portion requires it now, as much as any portion of the South bay. The purification of the sewage before its entrance into the bay, including therewith the drainage from the brewery and factory and the adjacent houses, will greatly improve the condition of this portion. The city draws its supply of water from the channel in front of the city, a short distance below this North bay, and it is hardly to be doubted that some portion of the sewage pollution reaches the intake. The evidence of this pollution in chemical examinations is said to be small, but it is nevertheless sure. The location of the intake is prohibitory of the discharge of sewage into the river directly in front of the city, and should be prohibitory of the present method of discharge. Photographs 1, 2, 35 and 36 were taken here. Sketch on Plate XIX.

Between Hudson and Stockport.

One-fourth mile north of North bay is a large swamp 1,700 by 200 feet with no outlet apparent, full of vegetation, at the base of wooded hills. If it is a source of nuisance to any one, two large

culverts would probably give circulation enough to carry off the products of decay of the vegetation as rapidly as formed and so improve the condition of the pond. Sketch on Plate XX.

Bridge 305 is of fourteen-feet span, the outlet of a large pond and swamp, which is almost connected with the above by a long, marshy, obstructed strip along the track. The pond is about 2,200 by 350 feet, and is grown up with rushes and swamp vegetation, except in an area in front of the culvert. It probably needs two more outlets to insure good circulation, and the long, narrow swamp could well be filled. Sketch on Plate XX.

Between bridges 305 and 306 is a long, narrow, wooded swamp similar to that at bridge 323, but narrower.

Bridge 306 is over an arm of Kinderhook creek.

Bridge 307 has about 120 feet opening and is over the mouth of Kinderhook creek, at Stockport. The creek seems to be generally in fair condition. The water in the river in the vicinity is quite shallow. Some pollution from house drainage and mill refuse comes down the creek. Photograph 6 was taken here.

Between Stockport and Stuyvesant.

Bridge 308, of fourteen feet span, is near the north end of a pond about 2,200 by 200 feet, all grown up with grass and weeds, except a channel along the railroad about eight feet wide. All but this channel is bare at low tide, leaving a large expanse of mud, weeds and algæ exposed, which give rise to quite an odor. The bottom of the outlet is above low water. If it were high enough to keep the entire space covered with water all the time, the condition of the pond would be improved for a time, but nothing short of an open trestle would give sufficient circulation to keep the pond in good condition. Filling is the only permanent remedy. The pond is at the foot of a wooded hill, and a steeply sloping vineyard. The houses in this neighborhood may be too far away to be affected by the nuisance created in the pond. Photograph 5 was taken here. Sketch on Plate XX.

Bridge 309, of fifteen feet span, is the outlet of a pond about 2,000 by 300 feet, just above Stockport Landing. It is full of weeds at low tide, which are probably covered out of sight at high tide. The water is perhaps a foot deep in the culvert at low tide. The circulation is not very good, owing to the small opening of the culvert. A large culvert near the south end would

preserve the pond in good condition indefinitely. There are several houses near the south end. Photograph 7 was taken here. Sketch on Plate XX.

Bridge 310 of fifteen feet span, is the outlet of a pond about 800 by 100 feet or more, full of algæ and weeds which produce at times considerable offensive odor. Water scarcely flows through the outlet at low water. There are several houses near by. When complained of the place should be filled, leaving a channel to the present culvert to carry off surface drainage, which could then well discharge at or above high water level. Sketch on Plate XXI.

Bridge 312, just north of the above, was formerly the outlet of a swamp and water-way, but the swamp is now being filled up for a brickyard with a channel left for the surface drainage.

Bridge 318 is a culvert made of two large sewer pipes, the outlet of a pond about 1,200 by 200 feet, filled with weeds, algæ, etc., and stagnant. It is just north of Coxsackie station, and several houses are on and near its banks. Stagnant ditches extend along both sides of the track, almost to the station building. Filling should be resorted to. Sketch on plate XXI.

Bridges 319 and 320 are the outlets of a shallow, reedy pond about 3,500 by 300 feet, much of it about the level of low tide, in about the same condition at present as the river outside the embankment. Several houses are along the road running on the eastern side of the pond. A better circulation of water should be secured by more and larger openings, and the portion behind the embankment can then be retained in as good condition as that outside. With the present openings, much of the organic matter produced by the growth of vegetation must remain inside, and will in the course of time become a source of trouble, while free circulation would carry a much greater proportion of it away and prevent the formation of a malodorous marsh. Sketch on Plate XXI.

Bridge 322 is a culvert of three feet span, the bottom of which is a little below high tide. The culvert is the outlet of a small swamp, about 400 by 50 or 60 feet, which is apparently not much of a nuisance. Can readily be filled if at any time found necessary. Sketch on Plate XXI.

Bridges 323, 324 and 325 are apparently all outlets of the same large swamp, which is one and one-fourth to one and one-half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there are several houses thereon near the pond. Filling is the only remedy that will be complete. An ample channel and proper slopes to take care of the surface drainage and the small water-course should be provided for. Sketch on Plate XXVI.

Bridge 331 is the outlet of a flood-water run from the hill. It is at the southern end of a swamp about 400 by 50 feet, which should be filled if valid complaint is made by the residents in the houses near. Sketch on Plate XXVI.

Bridge 332, about twelve feet span, is the outlet of a pond about 1,300 by 200 feet, most of which is deep. The pond could be preserved in good condition if the outlet, now above low water, were deepened and widened so as to give a better circulation, and if 200 to 400 feet at each end were filled above the level of high water. Sketch on Plate XXVI.

Bridge 333 is three small culvert pipes, the outlet of a pond on the north side of the railroad station at Schodack Landing. The main part of the pond is about 700 feet long and 200 feet wide, is stagnant, since the outlet is at or above the level of ordinary high water and two of the pipes are stopped up, and is probably a nuisance at times to the houses on the street above it, especially as some house drainage probably reaches it. It should be filled, proper provision being made for surface drainage. Sketch on Plate XXVI.

Bridge 334, of fourteen feet span, is the outlet of a small creek with a small swamp about on the level of high water, from 600 to 800 feet long and 100 feet wide, which can be easily filled if it proves to be a nuisance to the houses of the village on its banks. Sketch on Plate XXVI.

Bridges 336 and 337 are outlets of a swamp near the level of high water. The condition of the swamp can be improved by ditches running to the two culverts and to another which should be inserted between them. The swamp can thus be made fairly dry and most of it suitable for some kinds of crops. It may be necessary to fill slightly some of the lowest places. The swampy area is approximately 2,000 by 1,000 feet, lying along the base of a hill with a road and several houses near its edge. About one-fourth mile north is a similar swampy place, perhaps one fourth mile long and 200 feet wide, with no outlet, but otherwise in much the same condition as the other and to be benefited by about the same treatment. These swampy areas are accompa-

nied on the outside of the railroad embankment by similar areas in practically the same condition, which can be more easily drained because the outlets to ditches can be chosen with less restriction. Sketch on Plate XXVI.

Bridge 338 is a short distance above the swamp just mentioned, but apparently has no connection with it. A connection with it would be of little use, as it is too far away for the fall available to carry the drainage water. Sketch on Plate XXVI.

Bridge 339, of fifty feet span or more, is at the outlet of a creek. South of it is a stagnant pool about 600 by 100 feet, whose connection with the creek is greatly obstructed by a dyke and insufficient channels. This portion should be filled. North from the creek runs a ditch along the track to bridge 340 with one break, where a private roadway crosses the track. This ditch seems to be one from which dirt was taken to build a portion of the railroad embankment. It is much obstructed with weeds and brush. The tide rises and falls in the greater part of it, and it should be kept clean, or filled to a level above high water. On the river side of the embankment is a thin growth of aquatic grasses. Sketch on Plate XXVI.

Bridge 342 is at the mouth of Papscanee, or Dead creek, an arm of the river which runs for over four miles along the river, opening at both ends into the main river. Nearly a mile above bridge 342 is another arm which formerly connected the said creek with the river, dividing the ground inclosed between the creek and the river into two islands, Pixtaway island at the south and Papscanee island at the north. The railroad embankment has been built across this arm, leaving no opening but a small culvert not of sufficient importance to receive a number. Nearly three miles above bridge 342 the railroad crosses the creek, which thence continues on the river side of the railroad embankment for over a mile further north. No opening is left in the embankment at the crossing. About three miles of the creek, which is from 75 to 500 feet wide, has no outlet or inlet except bridge 342. There is, therefore, but little circulation therein and it is quite stagnant. The soil on these islands is wet, as they lie quite low, and are subject to overflow at times of flood, but it is in general subject to cultivation and suitable for certain crops. Throughout nearly the whole four miles of railroad above described the embankment was apparently made by throwing up the earth from ditches dug along

its base. These ditches are, most of them, so low that the water stands in them nearly or quite all the time, and as no attempt has been made to connect them together or to the river or creek, they are quite stagnant and at times quite odorous from the decay of the vegetation which finds root there. These conditions of the creek and the ditches are not strictly sanitary, but they are an addition of but a small amount to the unsanitary conditions produced and in process of production by the dykes built in the river to confine the channel and improve the navigation, the character of which is described in brief elsewhere. Sketch on Plate XXVII.

WEST SHORE.

[Bridge numbers on the west shore are those of the New York, West Shore and Buffalo railroad.]

Bridge 36, at the thirty-sixth mile-post, is a trestle of twenty-eight spans, in all about 450 feet, at the mouth of a creek, and extends along the railroad perhaps 700 feet. Sketch on Plate XXII.

Bridges 37, 38, 39, 40 and 41 are trestles from 200 to 500 feet long, across coves with rock bottoms and sides. All, from 36 to 41, are at present clean and clear, and will remain so as long as the trestles remain open.

Bridge 42, at the thirty-eighth mile-post, is across a cove with soft bottom such that canal boats were sunk to carry the weight of the embankment. It is of about 130 feet span and the cove is about 700 by 60 feet, without much circulation, and is possibly a nuisance at times. Sketch on Plate XXII.

Bridge 43 is a trestle of about 250 feet opening, across an opening in similar condition to that at 42 and possibly somewhat of a nuisance at times. The cove is about 1,100 by 100 to 200 feet. A small mountain brook enters near the south end, the trestle being at the north end. The south end is grown up with marsh-grass. Bridge 44 is similar to 37, about 400 feet opening, cove fifty feet wide. Sketch on Plate XXII.

About 900 feet south of bridge 45 is a rock fill about 600 feet long, which cuts off a cove nearly 200 feet wide, at the base of a rocky hill. It is at present clean, owing to its rock bottom, but has little or no circulation and may become quite a nuisance in course of time. Sketch on Plate XXII.

Bridges 45 and 46 are outlets of a great marshy tract back of Iona island. Much of the railroad line is on trestles and is but

little obstruction to the circulation of water. The trestles should not be filled as any material restriction of the outlets to the marsh would probably produce a great nuisance. The present condition is not all that could be desired, but it is bearable, and in view of the difficulties involved in any improvement, should not be allowed to deteriorate. Sketch on Plate XXV.

Bridges 47, 48 and 49 are open trestles. When 47 and 48 are filled, the entire cove should also be filled. When 49 is filled, one or more large openings besides the draw should be left, to insure good circulation. Sketch on Plate XXII.

Above Fort Montgomery are three coves with no apparent outlets. One, at the forty-third mile-post, is about 400 by 150 feet, with cow stable, pig-pen, duck-yard adjacent, and is rapidly becoming a nuisance. Just north is another in similar condition, 300 by 80 feet. Five hundred feet or so farther north is another about 700 by 200 feet, which is not now a nuisance, but will be in time if its circulation is not greatly improved. Near the forty-fourth mile-post are three others in similar condition but smaller, one having a culvert of about twenty feet span. All will require filling sooner or later. Sketches on Plate XXII.

Bridges 60 and 61 are outlets of a cove about 2,300 by 300 feet in a pocket just below Storm King, and consequently not much nuisance except to the house or two on its banks. The circulation is fair, but the depth of water is such as to permit the growth of marsh grass, and the decay of the vegetable matter must produce some unpleasant odors. Sketch on Plate XXII.

Bridge 64, of about 350 feet opening, is at the outlet of Murderer's creek and at the head of the cove above Cornwall. The cove is shallow for a half mile or so outside of the bridge, with a channel dredged for brick barges. South of the bridge, the cove behind the railroad is almost bare at low tide, just deep enough to present excellent conditions for the growth of vegetation, and as the circulation is very poor, there is a strong odor from the area. Bridge 63 is an outlet at the south end, which is apparently of but little use. The area above described should be filled. North and west of bridge 64 the creek and cove are grown up with much grass and weeds, producing a great marsh for which there is not much remedy at reasonable expense, except, perhaps, a dam with sufficient depth of water to prevent the growth of grass and weeds. There is now but little circulation over a great

area, except along the creek, and the malarial influences of the place must be great. Sketch on Plate XXIII.

Bridge 66 (?) is of two spans, each sixteen feet, but one deep enough for a flow of water at low tide. The cove is about 700 by 150 feet and seems to be remote from houses. Is grown up with grass and weeds, having always some water in it, though a channel through the bridge and the gravel outside would probably empty it at low tide. Should be filled if complained of. Sketch on Plate XXIII.

Bridge 67, of twenty-five feet span, is near the north end of a pond about 700 by 150 feet, in very bad condition, with houses and brick-yards near or on the banks, to which it is probably considerable nuisance. It should be filled. Photograph 28 was taken here. Sketch on Plate XXIII.

Bridge 68 is the outlet of a cove which should be filled, as it is in about the same condition as the above but somewhat larger, and is on the edge of New Windsor. It is now being filled slowly with refuse from brick-yards. Photograph 27 was taken here. Sketch on Plate XXIII.

Bridges 70 and 71 are the outlets of a long pond in front of brick-yards at New Windsor, into which considerable sewage and other refuse is dumped. Roadways from the brick-yards greatly obstruct the flow of water, whose circulation is not good. Bridge 70 is too high to serve as an outlet except near high tide. The process of filling should be continued as rapidly as possible before the pond becomes too great a nuisance. Sketch on Plate XXIII.

Bridge 85 is a long trestle across a cove about 200 feet wide, with brick-yards, houses and outbuildings on its banks. Part of the trestle is filled in and is in somewhat worse condition than the rest. The whole pond should be filled as the trestle is filled. Considerable odor was noticeable at the time of our visit. Just above Roseton. Sketch on Plate XXIII.

Bridge 86 is a similar bay not now a nuisance, but should be filled if the trestle is filled. Sketch on Plate XXIV.

At Hampton Ferry is a marsh about 300 by 25 feet, which is somewhat of a nuisance from decaying vegetation. It has a culvert of seven feet span, through which water does not run at low tide. Should be filled.

About 1,000 feet south of bridge 92 is a ditch 550 by 20 feet, whose culvert of nine feet span is nearly at the level of high water.

It should be filled if subject of complaint. Sketch on Plate XXIV.

Bridge 92, of five feet span, and 92 A of about 200 feet opening, are outlets of a pond 1,000 by 150 feet, grown up with weeds, except at the trestle, and with poor circulation. It is at the base of a cliff, is shallow, and can readily be filled if necessary. Sketch on Plate XXIV.

Bridge 95 has been filled, leaving bridge 96 of seventy feet opening, as the only outlet of a cove 1,900 by 300 feet or more, on the south edge of the village of Marlborough. There is a good circulation near the bridge, but very poor at the south end, causing considerable nuisance from the retention of decaying weeds and grass. A creek comes in at the north end from the direction of the village. The southern end of the cove should be filled. Nearly 1,000 feet south is a trestle across a small cove. If the trestle is filled, the cove should be also. Sketch on Plate XXIV.

Just north of the freight-house at Marlborough is a small pond 500 by 30 feet, at the foot of a cliff, with a small creek entering it, and a small two-foot culvert under the railroad. The fresh water from the creek has so far kept the pond sweet. Sketch on Plate XXIV.

Five hundred feet north of the above is a pond 900 by 30 feet, with a twelve-foot culvert and but little circulation, from which comes considerable odor of decaying vegetation. It is at the foot of a steep, wooded cliff and may not be a source of discomfort to anyone. Sketch on Plate XXIV.

Farther north is a long, narrow pond 2,000 feet or more by 40 to 75 feet, on the convex side of a long curve, with an outlet of fourteen spans near the north end, at the foot of a steep hill partly cultivated. A deserted house is near the north end. There was but little evidence of nuisance at the time of our visit, though the water was full of weeds. Its depth is probably sufficient to keep it in fair condition at present. It must eventually be filled. Sketch on Plate XXIV.

Bridge 99, of twelve feet span, is near the south end of a swamp 250 by 20 feet, partly uncovered at low tide, with little circulation and full of weeds. A small creek enters at the south end. Just north is another spot, 125 by 15 feet. Both are odorous and should be filled. A house is on the bank of the first-named. Sketch on Plate XXIV.

Bridge 102, of nine feet span, is the outlet of a small pond 250 by 50 feet, with a small drain entering, which is nearly dry at low tide and should be filled. Sketch on Plate XXIV.

Bridge 103 is over the outlet of a creek. Two hundred and fifty feet north is a pond about 2,000 feet long and 200 feet wide. The southern half is nearly shut off from the northern by a projection from the hill on which a house and buildings stand. The connecting channel is but about one foot deep and the south end therefore has but little circulation not obtained from a small brook entering it. Bridge 103 A is the outlet of the northern half. It has been reduced from a long trestle to about eighteen feet opening. More openings are needed, especially at the south end. Five hundred feet north is another cove also about 2,000 by 200 feet or more, whose south end is also nearly cut off from the north end, the north end having an outlet in bridge 103 C of thirty feet opening. Bridge 103 B was a trestle which has been filled. These ponds are at the foot of a steep hill and cliff and have considerable vegetation growing in them. Additional openings are needed here also. Sketch on Plate XXV.

About one-quarter mile south of the seventy-fourth mile-post is a culvert of nine feet span (bridge 117 ?), the outlet of a cove about 800 feet long, with very little circulation, almost the entire surface being covered with a green coating of algæ. It may be quite a nuisance. May be filled or the circulation improved by an additional larger culvert. At the foot of a very steep hill. Photograph 30 was taken here.

A short distance below the seventy-fourth mile-post is a culvert of nine feet span (bridge 118 ?), the outlet of a pond about 400 by 50 feet at the foot of a steep hill. The water runs through the culvert only at times of high tide, and the pond is capable of considerable nuisance. It can be readily filled, leaving a channel for the surface drainage.

Bridge 119 (?), of three feet span, is the outlet of a pond about 400 by 40 feet, which receives some surface drainage from its high steep banks, and is in fair condition. It can be readily and cheaply filled if necessary. Water runs through the culvert only at high tide. About 500 feet south is another pond about 300 by 50 feet, with no outlet except by percolation through the bank. Should be filled.

About 400 feet south of the seventy-fifth mile-post is a pond about 150 by 30 feet with no outlet, and quite a nuisance if any one is near enough to be affected. The banks are high and vertical.

Just below the seventy-fifth mile-post is a pond about 400 by 50 feet of about the same character.

Bridge 125 is a trestle about 350 feet long. The whole pond should be filled if the trestle is.

The West Shore railroad here leaves the river bank.

At the village of Catskill is a long narrow pond on the upper side of the long dock running out to the steamboat landing, and lying between the road and the railroad embankment. This embankment is that by which the Catskill Mountain railroad reaches the steamboat landing. There is one opening from the pond to the river near its center, which is altogether insufficient. Some progress has been made in filling the area with garbage and refuse from the village. This has resulted in an almost unbearable nuisance, the decay of the vegetable matter in the filling material giving rise to very pronounced odors. The effect of the filling has therefore increased the nuisance due to the decay of the small amount of vegetation growing in the area. It is evident that the area should be filled, but it is also evident that it should be filled with reasonably clean material, that a greater nuisance may not be generated.

Of the sources of nuisance and of pollution of the river arising from the defects in circulation of water, there remain for description the great flats between New Baltimore and Troy, cut off from a free circulation to a greater or less degree by the dykes built to improve the navigation of the river. The accompanying maps of this part of the river are copied from the official maps of the corps of engineers, United States of America, under whom much of the work was done. They bear the date of 1877, but show with sufficient accuracy for the purposes of this report, the present condition of these dykes. It will be seen, upon an inspection of these maps, that large areas of low islands and shallow channels have been cut off from a full circulation of water at ordinary stages of the river. The more thoroughly this work is done the more pronounced is the effect upon the channel whose depth is to be increased. All the work done towards the improve-

ment of the channel has not been of a permanent character nor has all the work necessary been done. Consequently the maximum effect upon the areas cut off from free circulation has not yet been reached. The general plan seems to be to confine the water to a single channel by dykes closed usually at the upper end and thus giving some opportunity for the deposition of sediment by the flood-waters of the river. An opening is often left at the lower end of a dyke so that there is an opportunity for a certain amount of change of water by the ebb and flow of the tides. As already stated, the whole work is not yet done and some has disappeared which was not of a permanent character so that the total effect thus far has not been very great and has been subject to changes due to the change of currents by changes in the dykes. Enough effect has been produced, however, to show clearly that the improvement of the channels for navigation according to the present methods means a deterioration in the condition of the areas cut off therefrom as regards their sanitary aspects. It is apparently impossible to effect an improvement in the one without at least a temporary injury to the other, but the ultimate restoration of the earlier sanitary condition or an improvement thereof should be kept prominently in view in making plans for the improvement of navigation. The Hudson river carries down large quantities of silt, a large proportion of which is deposited in the section of the river under consideration, as the river slope is so reduced at Troy that the ocean tides run up that far. The deposition of this silt before the improvement of navigation was begun had rendered this part of the river shallow and sluggish during ordinary seasons and subject to overflow in flood seasons. The insertion of dykes has given a single narrow channel of but little greater depth for a constant flow and has had the effect of rendering like amounts of the areas behind the dykes of less depth, so that what has been gained in depth at one place has been lost in another. This, of course, means a retardation of the currents at these places, which, combined with the retardation on account of the small openings through the dykes for circulation, tends to the deposition of vegetable matter and the production of effluvium nuisances and malarial conditions of the areas. It will be possible, by taking proper account of the sanitary aspect of proposed improvements and modifying or adding

to the plans as these considerations would require, to hasten somewhat the processes of deposition of silt, and so raise the level of the flats to or above the level of the ordinary stages of water. Considerable improvement would thus result. The areas so built up will probably not be extensive enough to warrant their protection from all overflow. It is doubtless recognized that all efforts to improve the navigation of the river have the effect of causing the carriage of a portion of the silt farther down stream, to be deposited below the improvements, and ultimately to require the extension of the works. An unsanitary condition of some degree is apparently inevitable, but all care should be taken to prevent deterioration, and whenever possible to improve the sanitary condition of the river at the same time that the navigable channel is improved. See Plates XXVI, XXVII and XXVIII.

The great question as to the economic uses of the Hudson river has received the greater amount of attention during the investigation of the condition of the river, but the interests involved and the magnitude of the territory drained by the river and its tributaries has made a detailed report after a single short season's work impossible. I have thought it best, since a thorough understanding of the subject is impossible by a study of the comparatively small amount of information obtainable this season, to omit a detailed statement of the numerical and other definite results until additional and fuller data can be presented.

The uses of the river and its tributaries for economic purposes other than navigation and water-power can be grouped in two classes. The use of the river for the purposes of one of these classes is diametrically opposed to its use for the other.

The river and its tributaries are the source of great additions to the material wealth of the country in the vast quantities of water which are drawn from them for the use of the many cities and villages on their banks. The wealth of ice derived from the streams during the winter is only less than that of the water. The extent of this wealth is evidenced by the large number of ice-houses erected on their banks. Those standing on the banks of the Hudson are located on the accompanying maps and are evidence of the vast capital invested in this business. The capital invested by villages, cities and water companies in plants for furnishing water for domestic purposes is greater than that

invested in the ice business, many times greater, but my data are not yet of a sufficient volume to present a comprehensive statement of these amounts and it is reserved for a future report to give a statement of the extent of this interest. The river and most of its tributaries have been used indiscriminately heretofore, as drainage channels into which to empty the sewage of cities and villages, to dump the garbage collected from them, and to discharge the refuse from factories of all kinds. The effect of such use of the streams is evident upon the slightest reflection. Upon some of the smaller streams the effect of such indiscriminate discharge of offensive refuse is marked by the offensive condition of the stream. When such a stream discharges into a larger stream, the relative amount of pollution is reduced, and the obvious nuisance is decreased. The sum of all the amounts of pollution is a large quantity, how large, it will be the object of a future investigation to determine. The progressive increase in the amount of this pollution must also be estimated. That there is such an increase at an appreciable rate is, I believe, susceptible of proof. In the neighborhood of the larger cities on the Hudson, it is now and has been for some years, of sufficient amount to cause much unfavorable comment, and to pollute to an undesirable, and under certain circumstances dangerous extent, city water supplies drawn from it. The same is true of many of the tributaries of the Hudson. The large cities and villages drawing their supply from the Hudson that were under observation this summer, are Poughkeepsie, Hudson, Catskill and Albany, within the influence of the tides, and the consequent reversal of the current during portions of the day, and the group of cities and villages around Troy who draw their supplies from the river above the State dam at Troy. All of these are subject to considerable trouble from sewage pollution of the river especially those in the first list. This pollution is quite marked in the case of Albany, and is becoming noticeable in the other cases. All of these places discharge their own sewage into the river and a portion of the pollution of their water supplies is doubtless due to their own sewage. The principal tributary of the Hudson, the Mohawk, is in relatively worse condition than the Hudson, because it flows throughout its course in a more thickly-settled region than the upper portion of the Hudson, and is less in volume.

The amount of pollution to these streams from mill wastes is very large, and of all grades of nastiness. Some such drainage is possibly of benefit to the streams on account of chemical action upon other impurities which are met with, provided the amount is not too great in proportion to the amount of water flowing in the stream.

It is evident that an increase of pollution above a certain very moderate amount will prevent the further use of the streams in question for domestic water and ice supplies.

It seems to be a matter for careful consideration and investigation, to determine the amount and sources of pollution, the rate of increase in that pollution, as nearly as it can be estimated, the probability of the destruction of the usefulness of the river for furnishing potable water, the amount of property to be destroyed or reduced in value by such a course, the feasibility of preventing further pollution of the streams, the expense of this prohibition, the necessity of reducing the amount of pollution, the methods possible to apply for this purpose and their expense, and a comparison of the two sides of the case with a view of deciding to which class of uses it is most proper to dedicate the river, and of determining what course of procedure is best to enforce this decision.

That the matter is one of the utmost importance admits of no question. The cities of Poughkeepsie, Catskill, Hudson and Albany on the Hudson, and Schenectady and Cohoes on the Mohawk, taking their water supplies from these streams, are especially interested in the preservation of the purity of these streams, as it is very difficult if not impossible for them to obtain adequate supplies of water from other sources. The city of Albany has been on the search for other sources than the river for some years, and is still inadequately supplied and apparently must always be unless water is taken directly from the river. The city of Schenectady is in the same condition, and has been recently disappointed in its search for other source of supply than the Mohawk.

Respectfully submitted.

CHAS. C. BROWN,

Civil Engineer.

DESCRIPTION OF PLATES.

Plates I and II give the whole river from New York to Troy. From New York to Poughkeepsie the map is taken from the charts of the United States Coast and Geodetic Survey, the originals being on a scale of 1:60,000. From Poughkeepsie to Hudson the maps are from preliminary charts of the Hudson, issued by the United States Coast and Geodetic Survey, the originals being on the scale of 1:40,000. From Hudson to Troy the maps are taken from a sketch of the triangulation of the Hudson river by the New York State Survey, the original being on the scale of 1:40,000. The location of each cove is given on these maps, and the number of the bridge giving it connection with the river is given where there is a bridge with a number. The numbers of bridges on the east side of the river are those of the New York Central and Hudson River railroad, and on the west side of the New York, West Shore and Buffalo railroad. Those that are cut off from the river entirely by embankments are marked "C." The location of ice-houses is also given on these plates. Each group of ice-houses standing together has been considered as one, as there is great difference in size of houses and in number together. Each group has received a number beginning at the first ice-houses receiving their supply from the Hudson, which are located just below Poughkeepsie, and proceeding in numerical order up stream to Troy. In some cases the number of houses in a group is indicated, but not always. The ice-houses of the upper river are also located on Plates XXVI, XXVII and XXVIII.

Plates III to XXV, both inclusive, give sketches of many of the coves which are, or may become of bad condition. Most of these sketches are drawn to the same scale, but some of the larger ones are drawn to a smaller scale to get them on the size of plate selected. It will not be difficult to read the conventional signs used. The numbers of bridges are those of the two railroads on the banks of the river. The locations of the photographs taken are indicated on the sketches.

Plates XXVI, XXVII and XXVIII show the river in more detail from New Baltimore to Troy, especially with reference to the location of dykes for the improvement of navigation and their effect upon the sanitary condition of the river, the location of

coves and arms of the river cut off partially or entirely from connection with the river, and the location of ice-houses. Many sewers in Troy and Greenbush are located, but all of the sewers in these places are not located, nor are those in Albany. This matter will be attended to in the continuation of this report next year. These maps were taken from the charts of the surveys for the improvement of the navigation of the river made under the direction of the corps of engineers of the United States army. The scale of the original charts is 1 : 5,000.

DRAINAGE.

REPORT

ON

Improvement of a Portion of the Former Genesee Valley Canal.

ROCHESTER, *October* 11, 1889.

DR. LEWIS BALCH, *Secretary of State Board of Health:*

DEAR SIR.— In accordance with your directions I have recently made an examination of that portion of the former Genesee Valley canal which extends from the city of Rochester southerly through the towns of Gates, Chili and Wheatland, to the village of Scottsville, all in the county of Monroe. This portion of said former canal is now used as a feeder for the Erie canal, and the examination had for its object the formulation of proper recommendations to the Superintendent of Public Works of the State, for securing an improvement of the sanitary condition of said canal or feeder, in pursuance of the provisions of act chapter 470 of the Laws of 1889. A brief statement of the problem and the results of my investigations are now respectfully submitted in the following report:

The Genesee Valley canal originally extended from the Erie canal, in the city of Rochester, southerly through the valley of the Genesee river to the city of Olean; but in consequence of both relatively insignificant traffic and enormous costs of maintenance, it was ultimately abandoned as a navigable waterway, and was sold about ten years ago to a private corporation for railroad purposes. In this sale, however, the State specially reserved that portion of the former canal which extends from Rochester to Allen's creek, at Scottsville, for use as a feeder to the Erie canal, inasmuch as it served to deliver directly into the latter a relatively large volume of water from said creek. This use of the said canal prism continued until the year 1882, when that portion of

the channel which was located within the corporate limits of Rochester was also abandoned by the construction of a permanent dam across the prism near the southern boundary of the city, and the diversion of the water at this point by means of a large cast-iron pipe into another feeder of the Erie canal on the opposite side of the river, as will be seen by referring to the accompanying map. It is therefore evident that the efficiency of the former canal prism, from Rochester to Scottsville, as a feeder for the Erie canal, is limited by the discharging capacity of the aforesaid pipe on the one hand, and by the discharge of Allen's creek on the other; and to this subject further reference will be made below.

As originally constructed, the normal channel or prism of the Genesee Valley canal was twenty-six feet wide on bottom, with side slopes of two horizontal to one vertical, and a depth of four feet of water, thus making the width at water surface forty-two feet. In the part under consideration, however, these dimensions appear to have been considerably exceeded in many localities and for long distances, especially where the natural surface of the ground was a few feet lower than the normal level of the bottom. Under the latter circumstances, the bottom was formed by the natural surface directly, and a somewhat greater width was given to the channel, so that the cross-section is by no means uniform throughout the entire length, neither is the bottom on a continuous straight line or grade. The distance from Allen's creek to the pipe and dam at the southern boundary of the city of Rochester is about 10.1 miles, or 53,330 feet, which is divided by a lock of formerly six feet lift into two sections of 3.8 miles and 6.3 miles length respectively, the shorter section extending from the creek northerly to the lock. No attempt to control the flow of the water at said lock appears to have been made since the abandonment of the canal, as all the gates are badly dilapidated and left wide open, and the water now flows freely over the breast-wall at the head of the lock into the level below. At the creek the admission of the water into the canal prism is controlled by a pair of head gates and valves, which are manipulated by an attendant whenever required. This supervision is absolutely necessary, inasmuch as freshets cause a rise of several feet in the stream, whereby an overflow of the canal banks would ensue if the entrance were not thus guarded. To further assist

in preventing an undue accumulation of water in the prism, one waste-weir in the upper level near said lock, and two such weirs in the lower level, at points 3.4 miles and 5.0 miles north of the lock respectively, are still maintained.

For the greater portion of the year, however, the discharge of Allen's creek is comparatively small, and its entire flow is easily carried away by the old canal and the above mentioned pipe into the Erie canal feeder, on the east side of the Genesee river, in the city of Rochester, without bringing any of the waste-weir into action. To arrive at an estimate of this ordinary volume, I have computed the capacity of the said pipe from the dimensions and other data pertaining thereto, which were kindy supplied by Mr. John Bisgood, resident engineer of the western division of the New York State canals, and find that such capacity may be taken at about fifty cubic feet per second, under somewhat more favorable circumstances than commonly prevail in the channel. But to this quantity we must add something for loss of water by leakage, percolation and evaporation in flowing through a length of ten miles of artificial channel. A careful study of this subject induces me to place such loss at about fifteen cubic feet per second for the entire distance, so that the ordinary discharge of the creek can be considered as being about sixty-five cubic feet per second. It may be remarked here that during periods of drought the flow will doubtless be somewhat less than this latter amount; but as no definite data relating to the minimum flow of the stream are at present available, no reliable figures can be submitted beyond a limited number of observations made at different times by me at the mouth of the said terminal pipe, and from which I compute such flow at about thirty cubic feet per second in the pipe, and forty cubic feet per second in the creek. Under the circumstances, therefore, the assumption of an ordinary delivery of fifty cubic feet of water per second from Allen's creek into the said Erie canal feeder at Rochester appears thoroughly justifiable, and this discharge may accordingly be regarded as the present normal duty of the old canal prism from Scottsville to Rochester in its capacity as a *feeder;* but while it served as a *navigable channel* for canal boats, it was capable of discharging a much greater volume of water without serious interference with navigation, the additional quantity then coming from other sources than Allen's creek.

To state the matter in another form, it may be said that by the conversion of the former canal into a simple feeder for another canal, a relatively small amount of water is being conveyed under very unfavorable conditions in an unnecessarily large channel having a generally level bottom, and with the result that for the greater portion of the entire distance, a considerable depth of water, with a very sluggish current, must be maintained to secure the required delivery. As a consequence, a profuse growth of aquatic vegetation has developed on the bed of the prism, which not only offers great obstruction to the free passage of the water, but also gives rise to exceedingly offensive exhalations during the warm months by reason of the decay of the vegetable matter. Several species of such plants, which possess the property of developing highly disagreeable odors during their decay or alteration of structure, are found in prodigious quantity at many localities in the channel; and as they become detached from the muddy sides and bottom, at certain stages of their growth, they rise to the surface and form a dense greenish scum, which floats along with the current and gathers at any obstruction in compact masses of great extent and thickness. These masses, moreover, teem with small water insects, mollusks and other forms of minute animal life; and as these creatures readily perish when exposed to the air and the heat of the sun in summer, the effluvia from their decomposition serve to intensify the emanations of the decaying plants. In this manner a very noticeable pollution of the atmosphere along the course of the former canal is brought about every year, which continues with variable intensity for a period of from two to three months.

Furthermore, by the action of the elements and the burrowing of muskrats and fish in the soft earthen sides of the channel, the orginal sharp and uniform slope of the banks has gradually become reduced, so that the cross-section of the prism is no longer trapezoidal, but has assumed an irregular curvilinear form, with relatively flat side-slopes below the ordinary high-water level. The interception of the surface-drainage water from roads and cultivated land has also led to the formation of a number of bars in the prism; and as many of the shoals thus formed are now covered with another class of aquatic plants, such as flags, rushes, etc., which arrest the masses of floating vegetable matter before mentioned, a series of narrow swamps and foul mud-banks

are alternately covered and exposed by unavoidable fluctuations in the water-level, thereby presenting conditions extremely favorable for the development of malaria. Moreover, it appears to be the practice to draw off the water periodically from the prism during the summer, both for the purpose of making necessary repairs, and for killing the aquatic vegetation, which becomes so rank as to enormously reduce the delivery of water, even when the surface of the stream at Scottsville is raised one foot or more by the application of flash-boards to the crest of the dam. At such times the whole length of ten miles of channel is drained so far as practicable, owing to the absence of intermediate gates, and the offensive effluvia are then proportionately increased.

In consequence of these circumstances, much complaint has been made by the residents of the towns of Wheatland and Chili in the vicinity of the former canal about the pollution of the atmosphere, and the health officers of the said towns are firmly convinced that the malarial diseases which have prevailed during the past few years amongst the population along the route of the canal are directly traceable to the sources above indicated. They have accordingly declared the canal to be a dangerous nuisance demanding prompt abatement, or at all events being put into such condition as will prevent its becoming a menace to the public health ; and with this end in view, the people of the locality have secured the passage of act, chapter 470 of the Laws of 1889, whereby the Superintendent of Public Works of the State is authorized to expend the sum of $7,500 for the purpose of carrying out such improvements of the condition of the late Genesee Valley canal in said towns as the State Board of Health may advise and direct.

In considering the most practicable methods by which the necessary relief can be afforded in the present case, due reference must be had to the very limited sum of money which is available for the purpose. It will be remembered that the length of the old canal from Allen's creek to the terminal cast-iron pipe at Rochester is about 10.1 miles, or 53,330 feet, in which distance a total fall of only about ten feet can be secured for any other kind of channel than the present one ; also, that at the end of such channel a delivery of about fifty cubic feet of water per second should be insured, provided that this amount, or somewhat more to compensate for unavoidable leakage and evaporation, be flowing

at the time in the creek; hence, if a practically impermeable channel, such as a tight metallic pipe or a well-built brick conduit, were to be constructed, the computations would be made for a discharging capacity of fifty cubic feet per second, whereas in the case of an absorptive earthen channel, allowance for an average capacity of about sixty cubic feet per second would become proper. For the case of such an iron pipe or circular brick conduit, an internal diameter of 5.75 feet would be required, and the estimated costs thereof per lineal foot complete would be, at present prices for labor and materials: First, for cast-iron pipe, fifteen dollars; second, for wrought-iron or steel riveted or welded pipe, about the same price as for the cast-iron pipe, but depending somewhat upon certain details of construction; and third, for a circular brick conduit, with provision for suitable pile and timber foundation wherever required by reason of excessive depth of the present channel or treacherous natural bottom, an average rate of eight dollars and fifty cents. All of these prices contemplate the laying of the conduits in the existing prism and their subsequent protection by a moderate covering of earth. The total cost for thus permanently abating the evils complained of would accordingly amount to about $800,000 and $454,000, respectively, so that these methods must at once be discarded on account of their expense. Estimates for open channels with concrete and cemented masonry bottom and sides to secure water-tightness and permanency, also for a similar channel with its bottom and sides simply paved with ordinary field stones, also for a suitable wooden conduit formed of timber and plank, and for a simple open ditch formed in the bed of the prism, have likwise been prepared, the prices ranging from seven dollars to one dollar and fifty cents per lineal foot, and giving total costs of from $375,000 to $80,000; but all such plans are here of no avail on account of the smallness of the amount provided. It may be remarked in this connection that the foregoing estimates are submitted merely to exhibit the various suggestions which have been made for securing relief, and not with the view of recommending any of them under the circumstances, inasmuch as some far less expensive plan must obviously be pursued.

The evil complained of arises from the aquatic vegetation on the one hand, and from a lack of means to prevent considerable fluctuations of the water surface in the canal prism, on the other.

The former element can be mitigated to a large extent by removing a portion, at least, of the mud which has been allowed to accumulate upon the bottom and sides of the channel, especially in those places where such vegetation is now most luxuriant; and the latter element can easily be remedied in a permanent manner by the construction of a few bulkheads, with ample sluice and overflow capacity, across the channel at convenient points, so that by a careful adjustment of the sluice-gates to the variable supply afforded by Allen's creek, no appreciable differences in the water-level maintained in the canal will ensue, nor will it then be necessary to expose the bottom for the entire length on every occasion that the water may require to be drawn off for alterations or repairs at any point. With regard to the expense thus involved, it may be stated that each bulkhead with gates will cost about $350, and if the total distance of 10.1 miles be divided into three sections of about 3.4 miles each by means of two such structures, costing together $700, there will be left out of the said appropriation of $7,500 the sum of $6,800, which may then be utilized in cleaning out the bottom of the canal in those localities where such work is most needed. Obviously, the amount mentioned will not suffice to clean out the whole of the accumulations of mud and silt for the entire distance; but it will serve to bring about a very marked improvement in the sanitary condition of the prism for a few years, provided that it be judiciously expended in the manner indicated.

It is therefore recommended that one timber bulkhead be constructed on the breast-wall of the former lock No. 2, located about 3.8 miles north of Allen's creek, such bulkhead to be provided at the bottom, with four openings, about three feet wide and two feet high in the clear, each to be controlled by a suitable sluice-gate operated from the top; further, that the bulkhead be so designed as to serve for an overflow or spillway at a height of about 3.5 feet above the present top of said breast-wall, in order that a minimum depth of water of about 3.5 feet may be retained in the upper level when the supply from Allen's creek is, for any reason, shut off; also, that a similar bulkhead be constructed at some convenient point about 3.5 miles north of said lock, or in the vicinity of the present waste-weir at Little Black creek; and finally, that the bottom and sides of the present prism be cleared of a portion, at least, of the muddy accumulations thereupon,

wherever the density of the aquatic vegetation indicates that such a clearing would be expedient. An exact specification of every particular locality where work of this character should be performed is not now necessary, as much will depend upon the actual cost of such clearing when once commenced. The prism should also be cleared of all obstructions, such as old timbers, roots, railroad ties, fences, stumps, branches, etc., which arrest the floating masses of decaying algæ during the season, and care should, moreover, be taken to have such accumulations frequently removed wherever they occur in appreciable magnitude. It may further be remarked that the greater portion of the work and cost involved in the execution of the foregoing recommendations is one of legitimate maintenance of a portion of the regular canal system of the State, and that any additional amount necessary to put the said ten miles of Erie canal feeder into such condition as will prevent it from becoming a danger to the public health should fairly be advanced out of the general fund provided for the maintenance of the State canals.

By the plan herewith advocated the old canal will be kept in practically the same condition as a navigable channel, which experience has taught is not prejudicial to the health of the people who reside along its banks. In conclusion I beg to add that no working drawings of the proposed bulkheads have yet been prepared, inasmuch as it was presumed that the same would be supplied by the Superintendent of Public Works.

Respectfully submitted.

EMIL KUICHLING,
Civil Engineer.

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Respectfully submitted.

EMIL KUICHLING,

Civil Engineer.

REPORT.

ON

Plans for Drainage of Portions of Abandoned Chemung Canal at Millport and Lower Pine Valley.

UNION COLLEGE,
SCHENECTADY, N. Y., *October* 28, 1889.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.*:

DEAR SIR.—I have the following report to make concerning the plans for the drainage of portions of the abandoned Chemung canal at Lower Pine Valley, and at Millport:

At Lower Pine Valley I believe the proposed plan will not effect any great improvement. The proposed pipe will take the water from the canal if the catch basin is placed low enough, and a ditch is dug to bring the water from the lowest portion of the bed (near D), in the lock. But the catch-basin will require constant attention to keep it clean, and the ditch must be kept open. The pipe has a fair fall for its length, but is liable to stoppage from debris when the catch-basin gets out of order. The place will therefore still require considerable attention. The dangers from stoppage of catch-basin or pipe are still greater because Hubbard brook is a torrential stream, coming from a ravine, dry at times and subject to heavy floods, which bring down large quantities of slate, gravel and debris of all sort. The surface water in the brook runs from the brook into the canal, some flowing into Catherine creek at flood times, as may be seen by the elevations and the arrows on my copy of the plan. A box drain allows this flow into the canal, and probably lets out a portion of the water in the canal after a flood. Most of the rest of the water in the canal disappears in the course of time, by seepage through

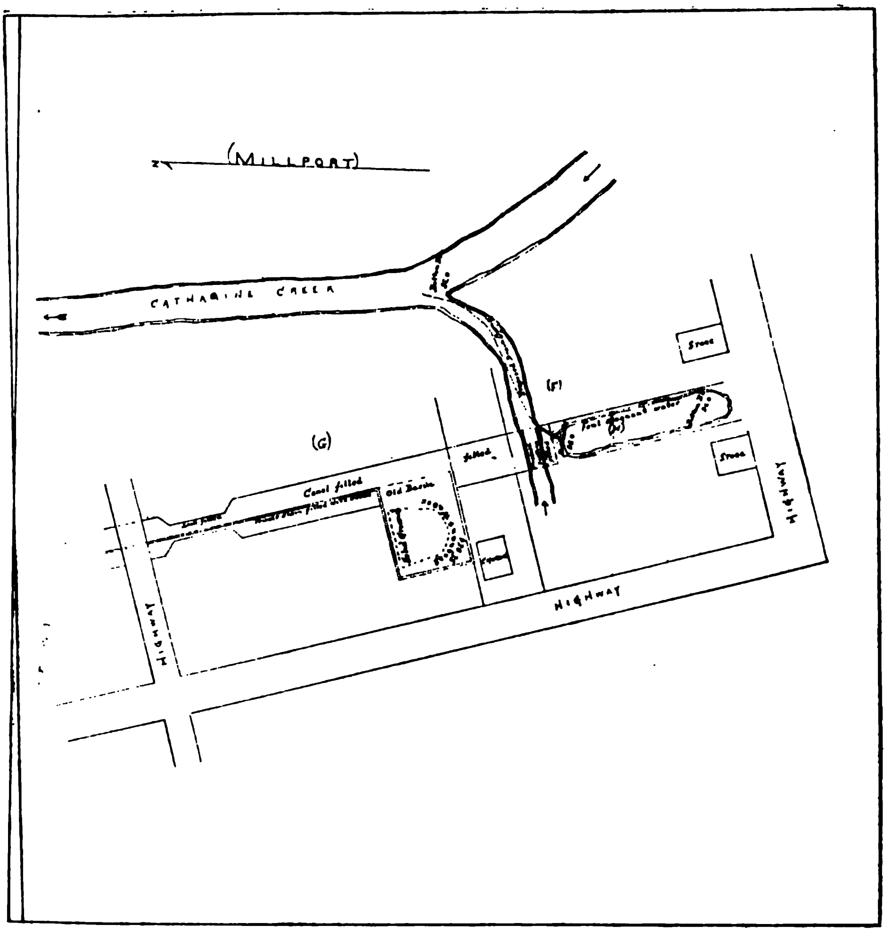
the bank into the creek. It is the recipient of considerable pollution from the house and privy on its bank, the inhabitants using the canal as a place of deposit for all their refuse. It receives storm water from a drain (B). In view of the facts that the proposed remedy can only be temporary, unless much attention is given to the apparatus, and that material for filling can be obtained from the old canal bank at (C), and at (A). I believe the best method of abating the present nuisance would be by filling, leaving a ditch to carry the water from (B) and from the filled canal above (E), this ditch to be turned towards the creek before the brook is reached. The use of this ditch as a depositing place for garbage being prohibited by the local board of health, the nuisance will be permanently abated, and will need no further attention.

The cost of this plan would be little, if any, more than that of the plan proposed, if the expense of future attention is considered. I can not give a definite estimate of the comparative cost, as I find no scale accompanying the plan.

At Millport it is also true that the best method of permanently remedying the present evil is by filling. The proposed open drain will carry off the water now in the canal at (H), but is liable to stoppages by the material brought down by the brook. The filling should be in addition to the drain, as the water should be taken out before the filling is done, it having no other way of escape. The proposed docking would not then be necessary. The inhabitants of the neighboring houses are largely responsible for the filthy condition of the water in the canal and also in the brook, both being highly polluted with the drainage from privies and cess-pools, and with garbage, and it may be considered equitable for the town authorities to see to the filling if the water is removed at the expense of the State. Nothing is said in the plan of removal of the stagnant water in the old basin. The best remedy here will be filling, The drain down the canal to the north should be kept clean. Material for filling can be taken from the old canal bank at (G) and perhaps at (F). There are several barns, privies and other buildings on and near the canal and brook which are not shown on the plan, and which contribute to their pollution.

Respectfully submitted.

CHAS. C. BROWN,
Civil Engineer.


(MILLPORT)
CATHARINE CREEK
(F)
(G)
Canal filled
Old Basin
Stone
Stone
HIGHWAY
HIGHWAY
HIGHWAY

REPORT

ON

Slaughter-house in Town of Fleming, Cayuga County.

ROCHESTER, N. Y., *October* 14, 1889.

DR. LEWIS BALCH, *Secretary of State Board of Health:*

DEAR SIR.—In response to your directions of the eighth instant to examine into the matter of the slaughter-house nuisance alleged to exist in the township of Fleming, Cayuga county, adjacent to the southern boundary of the city of Auburn, the undersigned begs leave to state that such examination was duly made on the twelfth instant, in company with the mayor and board of health of Auburn and the health officer of the town of Fleming. The facts thus elicited, together with the recommendations for improvement will be found set forth in the following report:

In the town of Fleming, only a few feet beyond the south line of the city of Auburn and a few hundred feet east of the highway called South street, there exists a group of three frame buildings, resembling barns of moderate size, which are used for the purpose of slaughtering animals for food. The two larger buildings of the group are arranged for the actual killing of the animals and the temporary storage of the meat, while the smaller intermediate building serves as a rendering-house and for other general purposes. Connected with the two former structures are pens for swine, which are fed upon the blood, entrails and other refuse produced in the premises. All of these buildings are of the simplest construction, with plain board sides and partitions, and having plank floors raised somewhat above the surface of the ground. The soil under and around these establishments is clay, and as a brick-yard had formerly been located here, the original

surface appears to have been lowered several feet in order to obtain the necessary material for the manufacture of brick. The excavation is somewhat extensive, covering an area of about one acre and having a surface with an extremely slight inclination to a shallow intersecting drainage ditch which communicates with a small rivulet, or natural water-course, flowing in a southeasterly direction through a portion of the second, eighth and ninth wards of the city.

The said ditch and rivulet are only a few rods distant from the slaughter-house and hog-pens above mentioned, and necessarily receive the drainage waters and leachings from the buildings and manure and compost heaps in times of rain; but it is fair to remark that at other times very little of the liquid waste produced in the establishment reaches the stream, as the bottom and banks exhibit no evidence of continuous pollution. It should also be stated that the aforesaid ditch has no appreciable fall or grade, and that the water from the rivulet sets back therein for a long distance, thus causing a partial stagnation. Cattle are, furthermore, kept in more or less number in the low area adjoining the ditch, and by their trampling in wet weather the soft clayey surface becomes indented with innumerable small depressions which retain the filthy waters until they disappear by slow absorption and evaporation. The locality is situated in Broad valley, which contributes a large volume of drainage water in the spring and periods of long-continued rain, all of which is intercepted by the small natural water-course; but as the latter has been replaced by a twelve-inch drain tile laid through certain premises for a distance of several hundred feet, beginning at a point about one-fourth of a mile north of or below the slaughter-houses, and as this tile has proved to be inadequate to carry off the flood volume, the waters at such times are set back and cause overflows from the stream upon the low grounds mentioned. On the subsidence of the freshets, however, more or less filth from the cattle-yard and compost heaps adjoining the hog-pens is washed away, thereby giving cause for complaint of pollution from the riparian owners further down the valley. It is also alleged that a number of cattle, pastured on the course of the stream within the city limits, have been poisoned by drinking the water therefrom, and that the foulness of the water continues to prevail even in seasons of drought. In

to this point, however, it may be mentioned that at the

time of our inspection the water appeared to be reasonably pure as it flowed through the slaughter-house premises, and that no appreciable pollution was then being contributed to it from the latter.

As stated above, there are two buildings in the group which are arranged as slaughter-houses, but only the larger one is now said to be used for such purpose, inasmuch as the smaller one was closed a short time ago by order of the health officer of the town of Fleming, Dr. B. I. C. Buckland, who, on a previous inspection, found it to be in an extremely filthy condition, and caused it to be cleaned. Since that time it does not appear to have been used, but whether it has been permanently abandoned, the undersigned is unable to state. The larger building is used by a number of different butchers, and is divided by rude board partitions into several compartments, in some of which the killing is done, while the rest serve as temporary storage places for the meat, until it has acquired proper consistency for removal to more suitable apartments elsewhere. Immediately contiguous to the places where the animals are killed the hog-pens are located, and behind these, in turn, are the manure and compost heaps where the refuse matters not consumed by the hogs, along with the excreta of the latter, are stored and treated with quick-lime. These heaps are formed directly on the surface of the clayey soil, and are entirely unsheltered. Near the west end of the main building a large barrel, buried nearly to its top in the soil of the yard, and filled with an offensive looking water, is alleged to be the site of a powerful spring of wholesome water; but as there was no trace of an overflow or change in the appearance of the liquid, the value of this source of water supply may fairly be questioned. A pump in the building itself, attached to a dry driven well, is equally unreliable; and the employés of the establishment informed us that all of the water used about the place was carried in buckets from a well several hundred feet distant.

From the foregoing brief description of the premises, it will be observed that the same afford opportunity for vast improvement. The freshly killed meat, hung for periods of not less than twelve hours, and often for twenty-four and even forty-eight hours, in the atmosphere of the slaughter-house, the hog-pens and the manure heaps, can not be regarded as safe from possibly dangerous infection, since it is a well-known fact that a large variety of

pathogenic organisms thrive upon such a surface; and even if noxious bacteria should not happen to be developed anywhere about the premises, nevertheless the exposure of the meat to attack by insects, which can secure easy access thereto through numerous holes and crevices in the sides and floor, can not be overlooked. The lack of an abundant and convenient water supply is also a source of danger, as it leads to the temptation to either make use of an improper supply near at hand, or else to forego the necessary cleanliness which is indispensable in a properly conducted abattoir. In justice to the occupants, however, it may be remarked that on the occasion of our visit the premises were generally in a good condition, and much less offensive odor was noticeable than had been anticipated. On the other hand, the plain fact that much of the improved state was due to quite recent efforts, could not be denied.

It must accordingly be admitted that the health authorities of Auburn were fully justified in complaining about the sanitary condition of the slaughter-houses and demanding proper relief. The true remedy in this and all similar cases would be the construction of proper abattoirs by the municipal authorities, where butchers could be compelled to slaughter their animals and store the meat in an unobjectionable manner, so that the public could have ample guaranty that the food upon which they depended had not been exposed to possible contamination. In the absence of any such abattoir at Auburn, however, and in view of the fact that for some indefinite period, more or less slaughtering will continue to be done at the premises under consideration, the following recommendations were made to the local health authorities:

First. That the premises should be thoroughly and scrupulously cleansed and disinfected with copious applications of quick-lime; and that they be thereafter maintained in such proper condition.

Second. That all drainage from the buildings, hog-pens and compost heaps be rigidly excluded from the above-mentioned small natural water-course and its tributaries. To accomplish this end, the roofs of the occupied buildings should be provided with gutters and rain-conductor pipes, in order that the rainfall thereupon may be collected at convenient points and discharged directly into the ditch or brook, instead of allowing it to percolate through great masses of manure or putrid compost, as at present;

and after having thus diverted the roof-water, all of the refuse matter and the excreta of the swine, together with the washings of the floors and pens, should be conducted to water-tight receptacles, cesspools, or pits, from which all surface-drainage water can be excluded, and in which such refuse can be composted, deodorized, or treated in the most advantageous manner without causing a nuisance. From such pits the material may then be removed as often as necessary, so that both their size and cost may become moderate. The liquid matter which will accumulate therein must either be removed in special vehicles, or else it must be absorbed by certain other solid matter, such as saw-dust, etc., in order to admit of excavation and removal in ordinary wagons. If properly treated, as above indicated, the whole of this mass of solid and liquid wastes will have a considerable value as manure, and the income derived from its sale will doubtless suffice to compensate for the costs of storage and treatment. Should it be found expedient to separate the liquid wastes from the solids, this can also be easily effected; but in any event the said offensive liquid must be got rid of by removal, since it can not be discharged into the small brook without giving rise to well-founded complaint. Owing to the impervious clayey subsoil, and the lowness of the surface of the land adjacent to the slaughter-houses, any method of subsoil or surface irrigation by gravity appears to be impracticable. It will also be desirable to properly grade the land around the buildings, so as to prevent the entrance of any storm-water into the said pits.

Third. That the freshly-slaughtered carcasses shall be temporarily stored in a suitable building, to be erected at some distance from the slaughter-house and hog-pens, so that the meat shall not be exposed to a foul atmosphere, or to the insects which always abound in such places. The expense involved in this recommendation need not necessarily be very great, and will amply be covered by a few hundred dollars.

Fourth. That efforts be made to secure an abundant supply of wholesome water in the buildings for general use. If the above-described alleged spring, near the west end of the present main building, should upon investigation prove to be suitable and adequate, this important provision can be very easily and cheaply secured, inasmuch as it will then merely be necessary to clean out, curb and cover said spring, and to lay a suction pipe therefrom to

the idle pump now attached to a dry tubular well. A cistern, erected at some height above the floor, might also receive the roof water, as well as the additional amount required to be pumped up from the spring; and thus conveniences tending to promote cleanliness are obtainable at a trifling cost. Should the alleged spring be inadequate, it should be filled up at once, and water obtained from another source.

Fifth. That the floors of all the slaughtering compartments and hog-pens be made water-tight, and of non-absorbent material as far as practicable. At present this provision is only partially secured in one or two places by means of a hardwood plank flooring laid over the old defective plank floor. It may be remarked here that wood is not a suitable material for this purpose, and that cement or asphalt laid upon a proper foundation is vastly preferable; but as the enforcement of the use of these latter materials would involve a great expense, and would only be supplying one of a number of other similar improvements, which would ultimately terminate in the construction of a rational modern abattoir, the undersigned has not deemed it expedient to insist upon such a costly reconstruction of the floors of the existing buildings. In like manner, the rough board sides and partitions in the structures may be regarded as unsuitable; yet by the exercise of proper care, and the liberal use of water and disinfectants, the wooden flooring and sides can be maintained in tolerable order. The necessity for the use of thoroughly non-absorbent materials for said floors and sides, moreover, disappears to a large extent if the freshly-slaughtered carcasses are stored in a separate clean building, as above recommended.

In addition to the preceding improvements, it would furthermore be desirable to secure an efficient removal of the storm-waters at all times through the said brook by the provision of an adequate channel throughout its course. There appears to be no good reason why proper drainage facilities for the low lands in the vicinity of the slaughter-house should not be obtained, as the natural fall in the brook is ample for the purpose. The expense so involved need not be great, since the work would consist mainly in clearing the channel of weeds and other obstructions, and its deepening for some distance beyond the mouth of the aforesaid drainage ditch sufficiently to make the latter efficient. Some difficulty will doubtless be encountered in bringing about

a restoration of the natural channel where the same has been replaced by a twelve-inch drain tile; but as this is essentially a legal matter, it may be omitted from further consideration here. It may also be remarked that while no complaint about the defective drainage facilities has been made by either of the local boards of health, yet it has been intimated that other needed improvements of the premises had not heretofore been made on the ground that frequent overflows of the brook would render such works of no avail. This latter reason, however, can not be regarded as valid.

It is generally admitted that the premises in question were in a deplorable sanitary condition during the past summer, and that the most offensive effluvia were spread by the winds therefrom throughout the whole neighborhood. Even the employés engaged in the buildings are said to have suffered, and it is alleged that in two such instances diphtheria was contracted and thence communicated to their families, with the result that five different individuals were affected, of whom two died from the disease. While some doubt as to the accuracy of this allegation appears to exist, nevertheless the fact remains that the establishment was not properly maintained, and that the improvements above indicated should be promptly carried out. In discussing the subject with the several parties interested, the said suggestions or recommendations were duly accepted, and it was understood that they would quickly be executed.

The question as to the wholesomeness of pork derived from animals which had been fed on slaughter-house refuse was also raised by the Auburn board of health. On this point much may be said on both sides; but practically, the weight of evidence seems to be against the proposition, on the ground that the swine are more susceptible to disease than if fed on vegetable food. With a thorough examination of all animals designed for human consumption, both before and after slaughtering, the danger to the public health would become very small; but inasmuch as such an inspection is necessarily costly on account of the high grade of skill involved, and as few communities appear to be willing to incur this expense, it becomes evident that general prophylactic measures are at present more applicable, and therefore it may be said that the sale of such pork should be carefully restricted to that which has been previously subjected to the most

searching scientific examination, since its quality may be regarded as doubtful, to say the least. The subject is, however, worthy of elaborate study, owing to the prevalence of this method of disposing of such refuse, and the implied sanction which it has received from numerous sanitary authorities in the past.

Respectfully submitted.

EMIL KUICHLING,
Civil and Sanitary Engineer.

REPORT

ON

Eagle Hotel at Norwich, N. Y.

By Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *December* 20, 1889.

Lewis Balch, M. D., *Secretary State Board of Health, Albany, N. Y.:*

Dear Sir.—I have the following report to make of our inspection of the Eagle Hotel at Norwich, and the accompanying recommendations thereon:

First. The privy pit is said to be a water-tight vault, and is of large size with a three-story building above it and a privy upon each story. There is practically no ventilation, a small rectangular box ventilator, which comes out below the second story, being of too small dimensions and too low down to have any appreciable effect. The privies on the several stories are connected with the main building of the hotel by dark, close corridors. The result of this construction is a great unventilated collection of foul air which under any circumstances would be a nuisance and a source of great danger, and which, under the present condition of neglect even of common cleanliness in the lower portion of the building becomes an intolerable nuisance. The accumulations of foul air are forced by wind, which has more or less access through small openings and cracks, into the hotel and to surrounding buildings and give rise to many just complaints. The warmth of the hotel in winter adds a suction through the corridors which draws in quantities of the air notwithstanding an attempt to keep the doors to the corridors closed, except at the moment of passage. It has been attempted to reduce the size of the pit by building a tight wall across one side, leaving the portion cut off unfilled. There is apparently connection between the two portions of the vault, not-

withstanding, and it is probable, judging from the information I was able to gather, that the vault is far from being tight, giving opportunity for leaching of the contents into the subsoil, and for the entrance of subsoil water into the pit. This water, with the chamber slops thrown in from the upper stories, make it impossible, without very great expense, to effectually disinfect the matter in the vault. Taken all together, the pit and the structure above it are as unsanitary an arrangement as it has been my misfortune to find.

Second. Two large leaching cess-pools are in the back yard of the hotel, only a few feet apart, and but a few feet from the privy pit. These are said to receive the wash water and the kitchen slops. The covers of these pits are in a condition that is dangerous to human life, the boards being so rotten that a man a little heavier than the average would quite probably break through. The pits are in the usual condition of such structures. Quite an ineffectual attempt at ventilation of one of them has been made by a wooden box ventilator up the side of the corridor. This ventilator is anything but tight, and has little effect in any case upon the pits. I understand that these pits are cleaned out once a year or so, and are extremely offensive during the operation. A slop hopper with coarse grating stands at the kitchen door, and is apparently trapped. An exceedingly inconvenient inlet for wash water is located in the basement laundry near the ceiling, the process being to have the wash water emptied into a barrel, and thence dipped up and poured by the bucket-full into the inlet. This inlet is said to be trapped, but it and the barrel are both very foul from neglect to keep them clean or to disinfect them.

Third. The roof water runs down a pipe which comes down in the center of the house to the second story, thence outside and down, discharging into an old unused well. At times of heavy rain this well is said to fill up and to overflow into the area way and thence into an unused cellar or basement under the portion of the house fronting on Broad street.

Fourth. An unused cistern is located under the cooling-room or ice-box and a store-house just off the kitchen, with openings into each. At the time of our visit this cistern had some water in its bottom, which apparently had some little connection with the ground water outside. If so, it is extremely liable to pollution from the cess-pools described above, which are located only a few

feet away. The air in the cistern had some evidences of such pollution in it, which indicated that the cistern was a source of danger. Emanations from this cistern directly into the cooler are absorbed by the milk, meats, etc., to their evident detriment.

Fifth. The wash-stand arrangements back of the office are the most primitive imaginable, consisting only of a wooden box, none too securely supported, into which the wastes from the basins discharge. A hole in its bottom at one end discharges into a wooden spout, which in turn is said to discharge upon the floor of the unused basement above referred to. When, through carelessness, the hole in the box stops up, the water overflows and drips down along the wall and the foundation. The continual dampness at its base has caused this foundation to settle and openings are left for entrance of outside air which complicates the case by freezing up the whole apparatus during cold seasons. The wet and filthy appearance of the stones were evidence of much carelessness and inattention.

Sixth. The bath-tubs in the barber shop are said to empty into a barrel set in the ground, which overflows into the basement when the discharge into the barrel is greater than the seepage from it into the ground.

On the whole the sanitary arrangements of the house are radically defective and require replacement by something which can do the work required of them. Those now in use can not under any circumstances perform their duties satisfactorily. The extent of the nuisance caused is, however, very greatly increased by the great lack of attention paid to the apparatus and the absence of cleanliness. It became quite evident during the inspection that the most ordinary pains to keep clean were not taken. This was evident throughout the portions visited and especially in the first story of the privy, the urninal more particularly, the laundry connection with the cess-pool, the wash-stand and the yards. Evidences of gross neglect of ordinary precautions in removing the deposits from the privy were also noticeable upon the ground outside, there being on the sidewalk and street droppings from the last removal.

Recommendations.

I wish to say first that any recommendations offered are for temporary arrangements only, pending the construction of sewers in the village. It is quite evident that a system of sewers is

needed for a portion of the village, and I would refer to a report to follow this upon that subject. It can be but a question of time, and perhaps but a short time, until the sewers are constructed. The arrangements recommended will, it is believed, answer the purpose until that time comes, if they receive proper care. This will involve considerable time and some expense, but I have attempted to make them as low as possible and am unable to find anything less expensive that will do the required work. It is probable that the full time of one man will be needed to keep the whole in order and in a proper state of cleanliness, with perhaps enough time left on his hands to attend to the cleanliness of some other portions of the buildings and grounds not specially mentioned, because not specially noticeable as nuisances to persons outside.

First. The privy pit should be thoroughly cleaned and pumped out until dry and then filled with *dry* and *clean* earth about one foot above the surface of the surrounding ground. Both divisions of the pit should be filled. The privies on all three floors should then be fitted with removable boxes under each seat, of such size and so located that they will receive all excreta, without danger of discharge upon the floor. One box to each single seat will be found the most convenient on the upper floors. One to each two seats may be quite as convenient on the first floor. These receptacles should be provided with covers fitting tightly, and with four handles put on near the upper edge, one on each side and end for the smaller ones and two on each side near the ends for the larger ones. The covers are to be used only when the boxes are in course of transportation to the place of disposal of their contents. A block and tackle should be so rigged over a trap door that the boxes can be readily lowered from the upper floors without danger of spilling the contents of the boxes. Heavy galvanized iron will probably be the most satisfactory material, and 18″ square or in diameter by 12″ to 14″ deep will be a fair size for the smaller ones. The same width and depth with a length sufficient for two seats will answer for the larger ones. Two complete sets of these boxes should be provided, so that there shall always be a box under every seat. On each floor should be provided a large box for the reception of ashes and clean dry loam. It is essential that the contents of these boxes be kept dry, and that there be no rubbish

mingled with them. The earth and ashes used to mix with the excreta should be free from lumps. It will doubtless be best to keep these boxes closed and fastened, so that no one but the persons having the closets in charge can interfere with them. This is especially so on the first floor in the men's closet. It should be one made man's business to attend to the deposit of a sufficient amount of earth in the boxes after each use to completely cover and deodorize the deposit. He should be on constant duty in the men's closet during the morning hours when it is most in use, and should make frequent periodical visits to the closets throughout the day and evening. The men's urinal will need especial attention. It might be made a chambermaid's duty to make periodical visits to the closets in the second and third floors to perform the same duties. Whenever boxes become full or nearly so they must be removed and empty ones put in their places. The contents of the boxes are excellent manure and some one can probably be found who will remove and return them for their contents. Every box should be thoroughly cleaned, washed, dried and disinfected as soon as possible after emptying. It will not be found necessary to empty the boxes in the second or third floors at very frequent intervals, and especial pains should therefore be taken to render each deposit inodorous by a careful and sufficient covering of the earth or ashes. Disinfectants may be necessary in small quantities at times, but will not generally if proper regard is paid to cleanliness.

The slops from the chamber floors must be removed in a similar manner. A sufficient number of receptacles of the general construction of milk cans, to prevent slopping over during removal, but with as few corners and narrow spaces as possible in which deposits can occur, should be provided. They can be somewhat larger than milk cans, but the necessity of lowering them to the first floor must be taken into account in determining the size. Disinfectants must be freely used in and about these cans, and at every emptying they must be washed clean and thoroughly disinfected before being returned to their places. An extra can for each floor should be provided so that there shall always be one in place ready for use. It will probably be necessary to empty these cans every day. Their contents should be so disposed of as to create no nuisance.

SANITARY CONDITION OF THE STATE.

SANITARY CONDITION OF THE STATE

AND

Summary of Mortality Reported in the Monthly Bulletin for 1888 and 1889.

By F. C. Curtis, M. D.

The State of New York, extending over nearly five degrees of latitude and nearly eight degrees of longitude, having maritime, lake and inland districts, a very varying topography and geological formation, thirty incorporated cities, which include in their number the metropolis of the country, having also large regions that are purely rural as well as regions of wilderness, a population approaching 6,000,000, with all degrees of density from that of the closely-built tenement districts to extensive areas which have a population of but two or three inhabitants to the square mile, representing every occupation and all degrees of mode of life, presents a rich field for the study of questions of interest to sanitarians and statisticians of the causes and conditions upon which the development and prevalence of diseases depend. In so far as the mortality of these various regions, with their varying conditions, can throw light on these matters report has been made from month to month in the elaborate bulletin which has for the past five or six years been issued by the Board of Health. The records of the central office show nothing beyond this printed issue except the detailed record which is kept of the mortality of every town or city constituting a health district, the additional mortality reported after the publication of the bulletin, the correspondence of the Board as to the special prevalence of diseases in various ocalities and the records made of inspections regarding local epidemics and local sanitary conditions. While little attempt is made to preserve material, except that which is of practical sani-

tary importance, it is possible to extract from it some data as a contribution to the scientific knowledge of diseases.

The State Board of Health receives the returns of vital statistics from local boards of health. The law requires one of these to be established in every town, city and incorporated village. Each being fully organized there would be over 1,300 local boards of health. Provision is made in the law whereby combined registry districts may be formed, and many of the smaller villages are thus combined with the towns in which they are situated. There are thus over 1,000 local boards of health, upon which the central office is dependent for a report of the mortality of the State. These are required to make a report by the fifteenth of each month for the month preceding. The thoroughness and efficiency of the performance of their duty is effected only by time and effort; it has improved year by year. During the year just closed it has been more perfect than ever before. Death reports have been received from all but forty-four towns, the aggregate population of which is about 80,000. Thus we have more or less completely represented the entire State less about one and a-half per cent of its population.

The increased perfection of returns may be seen also from the reported mortality of the bulletins. In 1885 the total number of deaths recorded in the bulletin was 80,407; in 1886 it was 86,801; in 1887 it was 96,453; in 1888 it was 103,969, and in the twelve months preceding December, 1889, it was 104,119. It will thus appear that there was an increase in 1886 over 1885 of 6,394; in 1887 over 1886 of 9,652; in 1888 over 1887 of 7,516, in 1889 over 1888 of less than 200. This increase is to be expected to attend increase in population and to be affected by the varying healthfulness of the State during different years, but for the years preceding the two especially the subject of this report it is unquestionably due to increasing completeness in the organization and work of local boards of health:

As will appear later in this report, there are now being reported a large enough mortality to make the death rate for the entire State for the last year nearly twenty per thousand population, which shows that only a small percentage of the number of deaths actually occurring in the State fail to be reported. The tables that follow do not contain all the reported deaths, since a considerable number came to hand too late for insertion in the

bulletins. The total mortality, however, as printed in the bulletins for each of the last two years, is more than eighteen deaths per thousand living population, estimating the entire population of the State now at five and three-fourths millions.

The following tables show the deaths as reported each month in the bulletin, the December of the year preceding being included for the sake of using for comparison the months properly belonging to the four seasons of the year:

TOTALS OF MORTALITY OF THE

MONTHS.	Total number of deaths.	Deaths under 5 years.	Percent'ge of deaths under 5 years to total deaths.	Cerebro spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
1887.												
December	7,888	2,497	31.6	37	....	104	78	12	204	44	35	21
1888.												
January	8,742	2,848	32.5	37	...	64	71	21	265	55	35	49
February	8,637	2,748	32.0	44	1	84	49	10	239	55	39	40
March	9,550	2,849	30.0	55	....	81	58	35	239	58	48	63
April	8,129	2,468	30.0	75	3	45	52	40	250	77	34	46
May	9,032	2,891	32.1	62	2	59	68	42	277	109	50	49
June	8,368	3,306	39.7	40	1	45	56	11	233	130	25	61
July	10,300	5,363	52.0	35	....	73	51	2	141	111	23	108
August	10,017	4,867	48.7	20	....	174	87	6	120	73	9	144
September	8,433	3,877	45.9	31	....	279	102	12	114	43	11	142
October	7,886	2,522	32.0	33	....	288	109	12	125	43	19	102
November	6,987	2,111	30.2	21	....	153	61	8	171	52	16	90
Totals	103,969	38,347	36.5	499	7	1,449	842	211	2,378	850	344	902

TOTALS OF MORTALITY OF THE

MONTHS.	Total number of deaths.	Deaths under 5 years.	Percent'ge of deaths under 5 years to total deaths.	Cerebro spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
1888.												
December	8,369	2,495	29.8	28	....	138	49	13	278	138	33	113
1889.												
January	8,437	2,983	35.2	35	....	89	51	15	242	164	29	105
February	8,183	2,933	35.8	32	....	71	30	9	324	136	30	119
March	9,547	3,381	35.4	43	....	69	47	1	386	150	33	157
April	9,078	3,116	34.5	45	...	78	64	2	363	148	47	137
May	8,357	2,773	33.2	42	....	63	37	....	276	108	40	121
June	8,370	3,632	43.4	27	....	45	59	....	154	64	20	120
July	10,806	5,563	51.4	46	....	117	61	1	69	33	14	112
August	9,373	4,059	40.7	33	....	224	96	....	54	22	10	133
September	8,264	3,179	38.4	10	....	247	98	2	53	9	14	90
October	8,050	2,288	28.4	21	....	261	87	....	57	7	13	70
November	7,285	2,025	27.7	21	....	169	63	....	56	26	21	55
Totals	104,119	38,427	36.8	392	....	1,571	742	43	2,312	1,004	304	1,332

STATE BY MONTHS, FOR 1888.

Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
883	78	190.00	1,205	1,022	75	441	408	543	798	208	295	761	636
879	78	176.75	1,563	1,089	105	481	412	553	916	203	278	882	715
667	85	154.00	1,644	1,112	105	437	434	563	878	193	233	1,042	674
682	109	147.37	1,762	1,238	138	450	423	608	991	204	292	1,096	935
448	113	150.00	1,332	1,117	90	407	404	549	966	186	265	738	890
627	131	141.75	1,438	1,195	98	458	481	570	1,009	211	370	738	988
490	811	227.34	778	868	94	516	393	491	1,075	237	411	472	1,130
411	2,957	380.00	588	966	73	784	383	492	930	210	397	454	1,111
345	2,465	345.82	528	959	74	647	402	473	1,010	227	370	530	1,347
308	1,440	294.32	649	895	69	600	343	494	895	198	303	510	995
432	386	196.37	1,031	1,034	70	518	392	495	791	232	278	512	984
538	112	174.88	1,051	893	58	414	398	522	796	164	300	443	726
6,710	8,765	216.00	13,569	12,388	1,049	6,153	4,873	6,353	11,055	2,473	3,792	8,178	11,129

STATE BY MONTHS, FOR 1889.

621	87	179.00	1,392	1,017	95	434	461	584	917	232	345	577	817
606	101	170.32	1,473	1,061	77	421	469	577	946	194	279	507	896
563	75	170.00	1,447	947	100	401	461	574	922	183	256	507	996
599	115	167.50	1,840	1,195	109	468	488	662	1,004	228	237	624	1,092
580	122	174.20	1,656	1,092	125	429	478	574	986	222	311	590	1,029
492	123	155.91	1,172	1,102	86	511	421	599	951	227	377	548	1,061
423	1,112	241.82	744	919	77	639	386	485	951	222	376	414	1,133
305	3,092	352.20	537	1,012	63	844	449	542	1,029	227	357	502	1,394
327	1,901	280.75	591	1,026	63	680	437	540	936	254	373	477	1,196
343	1,094	234.26	646	949	65	638	794	483	870	206	326	446	872
570	339	177.00	959	1,016	64	557	431	595	899	238	343	491	1,032
501	110	139.60	1,133	944	67	450	452	599	822	199	311	419	868
5,930	8,271	210.34	13,590	12,280	991	6,472	5,727	6,814	11,233	2,632	3,901	6,102	12,386

These tables show the number of deaths reported in the Bulletin. They fail to include all the deaths that have been reported, as a considerable number are sent in every month too late for insertion in the monthly issue. Up to the first of January there have been received 4,120 of these delayed returns for 1888 and about 3,000 more during 1889, increasing the actual number of deaths for 1888 to [illegible]. In the same way the actual number of deaths is increased by delayed returns received up to January, 1890, to about 108,000.

HEALTHFULNESS COMPARED WITH PRECEDING YEARS.

The mortality of early life and the proportion of deaths from the zymotic or preventable diseases furnish the readiest means of comparison of the healthfulness of the years under consideration with that of preceding years. It is in the early years of life that the greatest susceptibility to unhealthy conditions exists. These are conditions partly dependent on bad sanitation, partly on temperature and atmospheric conditions; a large proportion of the deaths from zymotic diseases occur in early life. It is because of the ready yielding of young children to the various ill influences that have a bearing on the health of a locality that a record is preserved of the proportion of deaths occurring under 5 years of age.

In the same way the mortality from zymotic diseases is a guide for comparison of healthfulness, and one of more definite value since these diseases are susceptible to control to a considerable degree. The following table shows the proportion of these deaths during the past five years. Consumption is included because of the relation that is coming into acceptance between it and the zymotic diseases:

COMPARATIVE MORTALITY OF THE LAST FIVE YEARS.

YEARS	Total number of deaths.	[illegible]	[illegible]	Deaths from consumption, per 1,000 deaths from all causes.
In 1885	[illegible]	[illegible]	222.17	139.78
In 1886	[illegible]	38.[illegible]	217.23	137.64
In 1887	[illegible]	[illegible]	227.[illegible]	120.36
In 1888	[illegible]	30.4[illegible]	[illegible]	130.00
In 1889	104,213	36.85	21[illegible].84	117.94
Average.........	94,350	37.00	219.87	127.14

Judging by the material of this table it would appear that the last two years have been years of fair average healthfulness. For the entire period there has been an average mortality of children under 5 years of age of thirty-seven per cent of the total number of deaths. Both years fall below this average, though to a not very material degree. From zymotic diseases the number of deaths in 1889 is less than that of any year of the series and that of any preceding year except in 1886.

As to consumption, the death rate from which has been introduced into the table, it is only to be remarked that its comparative mortality has steadily diminished with each year, there being a difference between that of 1885 and of 1889 amounting to nearly twenty-two less deaths in each 1,000 deaths from all causes in the latter year than in the first of our series. Wherein this is due to a smaller actual number of death from consumption and wherein to increase proportionally in the mortality from other causes will be subject for later consideration.

INFLUENCE OF SEASON ON MORTALITY.

The table exhibiting the mortality of the State by months shows a considerable variation in the total number of reported deaths at different periods of the year. Remembering that this variability is in a measure due to the irregularity with which returns are made by some health districts, it is nevertheless true that season has its influence in varying the rate of mortality. The following tables show, at a glance, the actual mortality of the four seasons and their relative infant and zymotic death rate, and the deaths also from consumption.

COMPARATIVE MORTALITY OF THE FOUR SEASONS.

1888.	Total number of deaths.	Percentage of deaths under 5 years of age.	Zymotic deaths per 1,000 deaths from all causes.	Deaths from consumption per 1,000 deaths from all causes.
In the winter months..	25,267	32.00	177.36	127.55
In the spring months..	26,711	31.00	146.97	132.90
In the summer months.	28,685	46.83	317.72	97.40
In the fall months....	23,306	36.00	221.86	121.12
Average..........	25,992	36.46	220.80	120.00

COMPARATIVE MORTALITY OF THE FOUR SEASONS — (*Continued*).

1889.	Total number of deaths.	Percentage of deaths under 5 years of age.	Zymotic deaths per 1,000 deaths from all causes.	Deaths from consumption per 1,000 deaths from all causes.
In the winter months..	24,889	33.60	173.73	121.53
In the spring months..	26,982	34.36	166.33	125.60
In the summer months.	28,549	45.16	303.47	103.57
In the fall months.....	23,599	31.50	187.12	123.26
Average	26,004	38.65	207.66	118.49

The mortality of early life is generally much less in the spring months than in any others. This is a general fact true of other years as shown by the next table below, and is true of 1888, but in 1889, both the autumn and winter rates are lower. The next lowest, in 1888, is the winter season, in which there is an increase of but one death per 100 total mortality. In the autumn there was an increase of five per cent above the spring season in 1888, it still being, however, a little below the average for the year. But the season of great fatality to infant life is the summer, during this period nearly half of the deaths being of children under 5 years of age. The reason for this is generally understood and is shown by the table of total mortality by months, in which the great mortality during the summer months from diarrhœal diseases is seen, which comes principally from the large cities.

Apparently the persistence of this class of disease into September and to an unusual degree into October is accountable for the higher death rate of 1888 of young children over that of the year preceding, as is seen by the following table:

PERCENTAGE OF DEATHS UNDER FIVE YEARS OF AGE, TO TOTAL MORTALITY, BY SEASONS.

YEARS.	Winter.	Spring.	Summer.	Autumn.	Entire year.
In 1885............	33.1	33.1	47.1	33.1	36.6
In 1886.....	32.2	31.9	45.0	38.7	36.7
In 1887............	36.6	31.9	46.0	33.3	36.9
In 1888............	32.0	31.0	45.8	36.0	36.5
In 1889............	33.6	34.3	45.1	31.5	35.2
Average	33.5	32.4	46.0	34.5	......

It is remarked that while there is considerable variation in some of the seasons in different years there is but a very trifling difference in the average infant death rate for the entire year. To this the year 1889 is an exception, the rate being considerably lower. This is because of a lower mortality, both in the summer and autumn infant mortality. It is also seen that in general, the first six months have fewer deaths under 5 years of age than the last six; the explanation for the high death rate in the spring of 1887, which follows a high death rate in the autumn of the year preceding is that there was then a great prevalence of measles. The variability of the autumn and winter mortality among children is due to the varying prevalence at these seasons of the eruptive fevers, which are more prevalent in some years than in others. The low autumn rate of 1889 is also partly due to the smaller degree of prevalence of diphtheria than usual during the year just ended.

For the sake of comparison the following tables are inserted here; they show the mortality as reported year by year for five years in each month of the year and the sum total of deaths that have occurred in the respective months:

MORTALITY

MONTHS.	Total number of deaths.	Deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial fever.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
January:												
1885	[illegible]	[illegible]	32.35	42	2	32	64	...	137	177	29	58
1886	6,747	[illegible]	33.1	28	24	66	53	3	138	20	34	192
1887	7,871	[illegible]	36.4	41	...	72	45	21	101	347	30	67
1888	8,742	2,848	32.5	17	...	64	71	21	265	55	35	40
1889	8,337	2,983	35.2	33		49	31	15	242	164	29	105
Totals	[illegible]	[illegible]	34.13	[illegible]	26	283	304	60	973	763	157	372
February:												
1885	[illegible]	2,288	34.27	40	1	32	70	...	126	154	41	53
1886	6,288	[illegible]	[illegible]	42	7	37	[illegible]	7	119	7	44	106
1887	[illegible]	[illegible]	[illegible]	39	.	37	46	21	79	239	28	39
1888	[illegible]	2,748	[illegible]	44	1	54	49	10	239	55	39	49
1889	[illegible]	2,933	[illegible]	32	..	71	30	9	324	136	30	119
Totals	[illegible]	12,313	34.17	157	9	321	261	47	987	591	182	365
March:												
1885	[illegible]	2,361	34.8	[illegible]	..	60	71	....	136	180	63	67
1886	[illegible]	2,352	[illegible]	[illegible]	5	73	78	6	119	21	46	129
1887	[illegible]	2,551	32.5	42		72	54	24	98	152	42	48
1888	[illegible]	[illegible]	[illegible]	44	...	74	56	33	239	56	48	46
1889	[illegible]	[illegible]	[illegible]	[illegible]	.	69	47	2	386	150	33	157
Totals	[illegible]	[illegible]	[illegible]	[illegible]	5	[illegible]	[illegible]	[illegible]	977	559	232	449
April:												
1885	[illegible]	[illegible]	[illegible]	[illegible]		68	73	1	141	191	44	86
1886	[illegible]	2,281	31.8	63	3	69	73	8	129	32	49	123
1887	[illegible]	2,443	[illegible]	56	1	56	73	12	112	111	45	30
1888	[illegible]	[illegible]	[illegible]	75	1	45	52	40	250	77	34	48
1889	[illegible]	3,216	34.5	45	.	78	84	2	363	148	47	157
Totals	[illegible]	[illegible]	[illegible]	270	7	316	341	63	995	559	219	284
May:												
1885	6,542	[illegible]	[illegible]	55	1	55	74	....	122	165	38	47
1886	6,659	[illegible]	31.7	55	...	45	75	5	116	37	43	89
1887	7,528	[illegible]	32.6	52	...	37	66	42	114	96	41	27
1888	9,032	2,891	32.1	62	2	53	68	42	277	109	50	49
1889	8,357	2,773	33.2	42	...	63	37	....	276	108	40	121
Totals	[illegible]	12,259	[illegible]	264	3	253	320	89	905	815	212	333
June:												
1885	[illegible]	2,483	[illegible]	[illegible]	1	54	74	3	106	128	32	46
1886	[illegible]	2,228	[illegible]	57	1	49	50	2	74	56	24	72
1887	7,484	[illegible]	[illegible]	57	...	54	67	7	109	65	26	30
1888	[illegible]	[illegible]	[illegible]	46	1	45	56	11	233	130	25	61
1889	[illegible]	[illegible]	45.4	27	.	45	59	....	154	64	20	120
Totals	[illegible]	[illegible]	[illegible]	218	3	257	306	23	676	463	127	329
July:												
1885	[illegible]	5,066	[illegible]	42	2	61	89	4	89	97	14	77
1886	[illegible]	5,021	53.5	44	.	73	61	....	49	80	10	114
1887	[illegible]	[illegible]	52.7	[illegible]	...	102	61	12	69	66	15	48
1888	[illegible]	[illegible]	52.0	35	..	73	51	2	141	111	23	108
1889	[illegible]	5,563	51.4	46	....	117	61	1	69	33	14	112
Totals	[illegible]	27,062	[illegible]	217	2	428	323	29	417	387	76	419

by Months.

Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
443	104	111.20	1,078	1,028	93	329	371	404	691	148	165	425	701
546	73	161.11	1,184	1,008	96	332	327	464	717	142	232	485	673
406	78	162.91	1,454	1,057	72	361	365	453	754	178	224	693	812
879	78	176.75	1,563	1,089	105	481	412	553	916	203	278	882	715
606	101	170.32	1,473	1,061	77	421	469	577	946	194	279	507	896
2,880	434	156.45	6,752	5,243	443	1,924	1,944	2,451	4,024	866	1,178	3,002	3,797
412	89	125.37	1,396	929	95	302	338	437	712	149	190	456	564
437	70	153.00	1,110	946	87	324	347	431	687	157	222	461	555
423	87	159.00	1,144	952	86	348	357	443	686	149	204	643	583
667	85	154.00	1,644	1,112	105	437	434	563	878	193	233	1,042	674
563	75	170.00	1,447	947	100	401	461	574	922	183	256	507	996
2,502	406	152.27	6,741	4,886	473	1,812	1,937	2,448	3,885	831	1,105	3,109	3,372
352	113	146.08	1,684	1,083	118	329	368	481	812	165	200	467	603
490	76	138.67	1,590	1,129	106	395	418	474	853	193	234	660	758
497	624	211.11	1,203	664	103	367	377	535	839	197	260	775	857
668	107	147.37	1,732	1,218	137	441	422	596	970	204	289	1,090	926
599	115	167.50	1,840	1,195	109	468	488	662	1,004	228	237	624	1,092
2,606	1,035	162.12	8,049	5,289	573	2,000	2,073	2,748	4,478	987	1,220	3,616	4,236
326	106	228.90	1,441	1,049	94	347	395	487	761	81	236	522	564
380	89	142.00	1,188	1,125	90	353	385	483	830	173	251	550	733
479	112	136.20	1,341	1,146	100	434	432	512	844	207	282	833	747
448	113	150.00	1,332	1,117	90	407	404	549	966	186	265	738	890
580	122	174.20	1,656	1,092	125	429	478	574	986	222	311	590	1,029
2,213	542	166.26	6,958	5,529	499	1,970	2,094	2,605	4,387	869	1,345	3,233	3,963
319	136	154.70	1,038	1,033	94	331	345	407	707	161	312	387	717
394	123	147.45	835	1,085	73	355	363	443	711	186	331	445	850
540	142	153.65	1,098	1,052	71	379	378	445	870	191	359	714	814
627	131	141 75	1,438	1,195	98	458	481	570	1,009	211	370	738	988
492	123	155.91	1,172	1,102	86	511	421	599	951	227	377	548	1,061
2,372	655	150.69	5,581	5,467	422	2,034	1,988	2,464	4,248	976	1,749	2,832	4,430
319	680	238.55	643	814	78	334	328	432	703	172	277	356	587
380	465	193.65	626	911	74	382	323	470	714	189	298	397	702
475	887	240.00	587	948	56	516	404	458	784	190	362	597	805
490	811	227.34	778	868	94	516	393	491	1,075	237	411	472	1,130
423	1,112	241.82	744	919	77	639	386	485	951	222	376	414	1,133
2,087	3,955	228 27	3,378	4,460	379	2,387	1,834	2,336	4,227	1,010	1,724	2,236	4,357
284	2,983	401.37	464	883	107	612	348	392	1,052	172	375	413	759
384	2,696	374.68	541	949	56	646	357	449	907	166	373	480	939
375	3,669	389.68	477	956	90	738	406	429	1,259	227	499	729	1,185
411	2,957	380.00	588	966	73	784	383	492	930	210	397	454	1,111
305	3,092	352.20	537	1,012	63	844	449	542	1,029	227	357	502	1,394
1,759	15,397	339.58	2,607	4,766	389	3,624	1,943	2,304	5,177	1,002	2,001	2,588	5,388

MORTALITY BY

MONTHS.	Total number of deaths.	Deaths under 5 years.	Percent'ge of deaths under 5 years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
August:												
1885	7,284	3,405	46.7	43	1	104	103	...	57	28	19	[illegible]
1886	7,142	3,312	46.3	49	1	104	66	....	43	45	11	[illegible]
1887	9,042	4,130	45.3	41	....	194	98	6	55	24	16	[illegible]
1888	10,017	4,867	48.7	29	....	174	87	6	120	73	9	[illegible]
1889	9,373	4,059	40.7	33	....	224	96	....	54	22	10	[illegible]
Totals	42,858	19,773	45.54	194	2	800	450	12	329	192	65	[illegible]
September:												
1885	6,251	2,309	37.0	35	....	145	110	5	39	10	12	[illegible]
1886	7,239	3,206	44.3	42	1	176	74	....	36	26	19	[illegible]
1887	8,267	3,218	39.0	38	....	248	141	10	83	16	11	[illegible]
1888	8,433	3,877	45.9	31	....	279	102	12	114	43	11	[illegible]
1889	8,264	3,179	38.4	19	...	247	98	2	53	9	14	[illegible]
Totals	38,454	15,789	40.92	165	1	1,095	525	29	325	104	67	[illegible]
October:												
1885	5,680	1,853	32.6	27	4	151	85	5	53	6	15	[illegible]
1886	7,370	2,730	37.0	32	1	194	118	2	51	53	17	[illegible]
1887	7,370	2,317	31.3	38	....	182	104	4	113	15	13	[illegible]
1888	7,886	2,522	32 0	33	...	288	109	12	125	43	19	[illegible]
1889	8,050	2,288	28.4	21	....	261	87	....	57	7	13	[illegible]
Totals	36,356	11,710	32.26	151	5	1,076	503	23	399	124	77	[illegible]
November:												
1885	5,448	1,620	29.7	25	2	126	69	8	77	17	19	[illegible]
1886	6,872	2,423	35.2	47	2	157	98	1	68	185	18	49
1887	7,292	2,171	29.7	29	....	149	80	4	130	30	25	[illegible]
1888	6,987	2,111	30.2	21	....	153	61	8	171	52	16	90
1889	7,285	2,025	27.7	21	....	169	63	....	56	25	21	55
Totals	33,884	10,350	30.50	143	4	764	371	21	502	309	99	[illegible]
December:												
1885	6,078	1,910	31.4	32	12	99	60	7	112	17	28	[illegible]
1886	7,603	2,868	37.3	50	....	112	85	5	69	333	42	49
1887	7,886	2,497	31.6	36	....	104	78	12	204	44	35	21
1888	8,369	2,495	29.8	28	...	138	49	13	278	138	33	113
1889	8,483	2,311	27.0	38	..	117	53	....	73	33	22	84
Totals	38,419	12,081	31.44	184	12	670	325	37	736	565	160	[illegible]

MONTHS—(*Concluded*).

Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
260	1,719	337,31	419	895	54	430	307	347	675	192	267	366	875
307	1,484	314.20	480	861	58	528	330	309	657	153	266	458	798
302	2,158	383.30	457	926	67	665	361	442	933	199	354	731	956
345	2,465	345.80	528	959	74	647	402	473	1,010	227	370	53C	1,345
327	1,901	280.75	591	1,026	63	680	437	540	936	254	373	477	1,196
1,541	9,728	330.27	2,475	4,667	316	2,950	1,837	2,111	4,211	1,025	1,630	2,562	5,170
314	839	325.75	475	886	59	412	316	358	651	137	271	398	681
322	1,186	272,88	497	919	61	588	352	386	674	165	298	474	843
559	1,009	261.15	697	980	45	522	352	503	722	232	331	765	959
308	1,440	294 32	649	895	69	600	343	494	895	198	303	510	995
343	1,094	238,26	646	946	65	638	794	483	870	266	326	446	872
1,846	5,568	278.47	2,964	4,529	299	2,760	2.157	2,224	3,812	938	1,529	2,593	4,350
429	324	204.22	525	927	58	342	313	362	603	160	238	341	651
618	493	226.20	845	985	50	497	366	407	692	193	294	549	825
767	297	201.63	853	942	53	458	367	475	759	207	309	717	743
432	386	196.37	1,031	1.034	70	518	392	495	791	232	278	512	984
570	339	177.00	959	1,016	64	557	431	595	899	238	343	491	1,032
2,756	1,839	201.08	4,213	4,904	295	2,372	1,869	2,334	3,744	1,030	1,462	2,610	4,235
478	115	181.85	716	831	63	302	310	388	619	158	249	353	470
675	166	213.33	1,056	982	70	328	361	448	576	166	264	494	661
844	117	200.00	1,041	964	67	370	375	499	709	178	301	718	640
538	112	174.88	1,051	893	58	414	398	522	796	164	300	443	726
501	110	139.60	1,133	944	67	450	452	599	822	199	311	419	868
3,036	620	181.93	4,997	4,614	325	1,864	1,896	2,456	3,522	865	1,425	2,427	3,365
572	93	185.42	984	875	61	273	330	405	662	192	212	405	552
664	107	200.00	1,427	1,047	63	338	376	474	781	167	233	537	644
883	78	190.00	1,205	1,022	75	441	408	543	798	208	295	761	636
621	87	179.00	1,392	1,017	95	434	461	584	917	232	345	577	817
546	110	126.35	1,635	1,127	83	463	466	656	950	238	288	455	1,046
3,286	475	177.59	6,643	5,088	377	1,949	2,041	2,662	4,108	1,057	1,373	2,735	3,695

TOTAL MORTALITY BY MONTHS

MONTHS.	Total number of deaths.	Deaths under 5 years.	Percent'ge of deaths under 5 years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
January	38.669	13.068	34.15	208	26	353	304	60	973	789	157	[illegible]
February	36.367	12.319	34.17	197	9	321	302	47	867	891	182	[illegible]
March	42.091	13.033	32.94	257	5	350	306	66	977	880	188	[illegible]
April	39.371	12.563	31.88	270	7	316	341	63	965	880	280	[illegible]
May	38.118	12.380	32.36	264	3	280	320	30	965	535	212	[illegible]
June	36.742	13.089	30.48	219	3	257	306	33	676	485	[illegible]	[illegible]
July	51.363	27.082	52.90	217	2	628	330	30	417	387	76	[illegible]
August	42.864	19.773	46.54	194	2	780	490	12	330	182	65	[illegible]
September	38.454	15.780	40.92	168	1	1.085	835	30	330	184	67	[illegible]
October	36.356	11.770	32.38	151	5	1.076	508	33	390	124	77	[illegible]
November	36.984	10.350	30.50	143	4	734	371	21	562	182	80	[illegible]
December	38.419	12.081	31.44	184	12	670	335	37	736	385	180	[illegible]

FOR FIVE YEARS — 1885-89.

Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
2.880	434	156.45	6,752	5,243	443	1,924	1,944	2,451	4.024	866	1,178	3,002	3,797
2,502	406	152.27	6,741	4,886	473	1,812	1,937	2,448	3,885	831	1,105	3,109	3,372
2,606	1,035	162.12	8,049	5,289	573	2,000	2,078	2,748	4,478	987	1,220	3.616	4,236
2,213	542	166.26	6,958	5,529	499	1,970	2,094	2,605	4,387	869	1,345	3,233	3,963
2,372	655	150.69	5,581	5,467	422	2,034	1,988	2,464	4,248	976	749	2,832	4,430
2,087	3,955	228.27	8,378	4,460	379	2,387	1,834	2,336	4,227	1,010	,724	2,236	4,357
1,759	15,397	339.58	2,607	4,766	389	3,624	1,943	2,304	5,177	1,002	,001	2,588	5,388
1,541	9,728	330.27	2,475	4,667	316	2,950	1,837	2,111	4,211	1,025	,630	2,562	5,170
1,846	5,568	278.47	2,964	4,629	299	2.760	2,157	2,224	3,812	938	,529	2,593	4,350
2,756	1,839	201.08	4,213	4,904	295	2,372	1,869	2,334	3.744	1,030	,462	2,610	4,235
3,036	620	181.93	4,997	4,614	325	1,864	1,896	2,456	3,522	865	,425	2,427	3,365
3,286	475	177.59	6,643	5,088	377	1,949	2,041	2.662	4,108	1,057	,373	2,735	3,695

THE ZYMOTIC MORTALITY.

This is the class of diseases of special concern to health authorities — the class of sometimes called preventable diseases. The infant death rate will be generally found to vary with them in prevalence, but some of them are peculiar to adult life, taking by preference those in prime of vigor. As classified by us it does not include all that might with propriety be included in the category of preventable diseases. Without doubt many of the deaths reported as from one of the large class of nervous diseases, would have been more correctly returned under a primary cause of death which would have placed them under the head of one of the zymotic diseases. The puerperal diseases are not included, although a large proportion of them are certainly of zymotic origin. The same is coming to be considered true of consumption, and there is a growing belief in the zymotic origin of some of the acute respiratory diseases. Only the diseases commonly recognized as zymotic are included in our classification as adopted for the *Monthly Bulletin.*

The effect of *season* on the prevalence of zymotic diseases is shown by the following table, which shows their relative prevalence year by year for five years, and also the averages for years and seasons, which are added as a gauge for comparison.

In each 1,000 *deaths there were from zymotic diseases :*

YEAR.	Winter.	Spring.	Summer.	Autumn.	Entire year.
In 1885..........	135.85	144.44	325.74	209.05	222.17
In 1886..........	161.51	142.70	294.18	237.46	217.23
In 1887..........	177.30	167.05	337.66	220.93	227.80
In 1888..........	177.36	146.97	317.72	221.86	220.80
In 1889..........	173.73	166.47	303.47	187.12	207.66
Average........	165.15	153.47	315.75	215.28	....

The main item of practical interest aimed at is to show by this table the comparative prevalence of the preventable diseases, during the last two years and the years preceding them. It incidentally appears that there is a considerable variation in the corresponding season in different years, as was seen to be true of the infant mortality. In the winter months of 1885 this rate was exceedingly low; that of 1888 being for this season the highest of

the series of years. For the entire year, however, that of 1888 was lower than that of 1885. The summer death rate from zymotic diseases in 1887, was the highest of all the seasons, so much so that it stands higher than any year in its proportion of zymotic mortality for the entire year. The winter rate for the two years 1888 and 1889, do not differ materially and are higher than the average of the series. The spring rate is higher in 1889 than in 1888, but its summer and autumn rate are considerably lower, and its total for the entire year is much lower than for any year of the five.

An attempt is made in the following table to show in detail the relative proportion of each one of the diseases belonging to this zymotic class. For the sake of retaining the comparison instituted for the entire class with preceding years, the table also includes the proportion of each disease for 1885, 1886 and 1887. It shows the percentage of each disease to the total number of zymotic diseases, occurring in the respective seasons of the year.

[…]AGE OF DEATHS FROM EACH ZYMOTIC DISEASE TO THE TOTAL ZYMOTIC MORTALITY, BY SEASONS.

	Total zymotic diseases.	Total per 1,000 deaths from all causes.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhœal diseases.
WINTER.												
5	3,306	135.85	3.5	7.4	6.4	....	11.0	13.5	3.2	4.9	41.9	8.7
6	3,265	161.51	3.1	5.6	5.5	0.5	11.3	1.4	3.3	12.0	47.6	7.2
7	3,882	177.30	3.9	6.3	5.0	1.2	6.5	24.0	2.5	4.0	39.1	7.1
88	4,077	177.36	2.5	7.4	4.4	1.0	16.5	4.0	2.2	2.6	51.1	6.8
1889	4,324	173.73	2.1	6.8	3.0	0.8	19.5	10.1	2.1	7.7	41.3	6.0
SPRING.												
1885	3,130	144.44	4.0	5.9	7.0	....	12.7	17.1	4.6	5.4	31.9	11.3
1886	3,110	142.70	5.8	6.1	7.3	0.6	11.7	2.9	4.4	11.0	40.7	9.3
1887	3,899	167.05	3.8	4.2	5.0	2.0	8.3	9.2	3.3	2.7	38.9	22.5
1888	4,074	146.97	4.7	4.5	4.4	2.6	18.8	6.[illegible]	3.2	3.5	43.1	8.7
1889	4,488	166.33	2.6	4.6	3.2	....	22.8	9.0	2.6	9.2	37.2	8.0
SUMMER.												
1885	7,683	325.74	1.6	2.8	3.5	....	3.3	3.3	0.8	3.2	11.2	70.1
1886	7,027	294.18	2.1	3.1	2.5	....	2.3	2.6	0.7	5.3	15.3	66.3
1887	9,174	337.66	1.6	3.8	2.5	0.3	2.5	1.4	0.6	1.5	12.5	73.0
1888	9,267	317.72	1.1	3.1	2.1	0.2	5.3	3.4	0.6	3.4	13.5	67.2
1889	8,674	303.47	1.2	4.4	2.4	....	3.1	1.3	0.5	4.2	12.1	70.3
AUTUMN.												
1885	3,751	209.05	2.2	11.2	7.1	0.5	4.5	0.9	1.2	5.6	32.5	34.2
1886	4,725	237.46	2.5	11.1	6.1	....	3.3	5.6	1.2	5.0	34.2	30.6
1887	5,076	220.93	2.1	11.5	6.5	0.4	6.[illegible]	1.2	1.0	1.5	42.2	28.0
1888	5,153	221.86	1.6	14.0	5.3	0.6	8.0	2.5	0.7	6.5	23.0	37.6
1889	3,415	187.12	1.7	19.8	7.2	....	4.8	1.2	1.4	6.2	41.4	45.1
Total	101,440	212.35	2.6	7.1	4.8	0.5	9.1	6.0	2.0	5.2	32.5	30.9

This table, covering the period of five years, represents a total zymotic mortality of 101,440, the entire number of deaths from all causes being 462,880. It shows, in detail, the seasonal distribution of the various zymotic diseases and their comparative prevalence year by year. A glance over it shows their variable degree of prevalence, one with another.

It is seen from the totals of the table that a little more than one-fifth of the entire mortality of the last five years has occurred from the zymotic diseases. Of these, nearly one-third have been due to diphtheria, and almost an equal proportion to diarrhœal diseases. These two occur with great uniformity, taken together; when one has a low death rate the other is generally high; the former causes many deaths in the colder season, the latter in the hot.

Scarlet fever, typhoid fever, measles, malarial diseases and whooping cough come next in importance, all of them, as a total for the five years, causing in the order named, from about nine to five per cent of the zymotic deaths.

These general statistics, do not, perhaps, differ materially from the commonly observed facts. But they have their value as a contribution to the general fund of information; the table, also, is of practical importance as a record of the prevalence of the various diseases, by seasons, for the past year as compared with former years.

ZYMOTIC DISEASES IN 1888 AND 1889.

For the years covered by this report 44,436 deaths occurred from zymotic diseases. The total mortality from all causes being 208,200, the rate per 1,000 of zymotic mortality was 213.43. These were all included under the zymotic diseases as enumerated in the *Monthly Bulletin*, there having been no report of what might be called exotic diseases, such as cholera and yellow fever. Reference to the last table will show their comparative prevalence one with another, their distribution in the seasons of the year and their comparative prevalence with like periods of former years.

Typhus fever.

Of this disease it is only to be said that there were but seven deaths from it during 1888, and these occurred only in New York and Brooklyn. During 1889 there have been no deaths from it, this being the only year of which this is true since records have

seventy-five deaths are reported from the smaller rural towns not individually designated in the bulletin.

Such has been the geographical distribution of the cerebro-spinal fever. Now as to seasonal distribution. Throughout the State as a whole, we find it causing a fatality not greatly varying month after month. The greatest number, however, come in the spring months, about one-third of the deaths in 1889 occurring in the spring, and one-fourth in the winter and the same in the autumn season. The mean of the 499 cases of 1888 per month is 41.6; the only months in which the number exceeds this are February, March, April and May, in which 472, or nearly one-half of the deaths occurred. The monthly mean of the three winter months was 39.3; of the spring months, 64.0; of the summer months, 31.6, and of the fall months, 28.3. In the corresponding periods of 1887 this variation was, as remarked in the last report of the board, much less marked. The number of deaths of the winter, spring and summer seasons was almost exactly the same, those of the fall months alone varying, and, just as was the case last year, being materially less than the other seasons. In 1885 we find the smallest number of deaths in the winter, the largest in the spring, one-third of all coming then, and the next largest in the summer. In 1886 we again find little variation, except in the fall months, which show a considerably lower actual mortality than the other seasons. Compared with the other zymotic diseases (see last table), we find the average percentage of cerebro-spinal fever in the winter season for the last five years to be 3.2; for the spring, 4.7; for the summer, 1.5; and for the fall 2.0.

We conclude from our statistics, that it is a disease occurring at all times in the year, that its greatest prevalence is in the spring months, and its least prevalence in the summer. It is noteworthy, however, the uniformity of its existence; no other diseases is so constantly present, as shown by the mortality from it.

Another notable fact is the steadiness with which it clings to a locality in which it becomes settled. It has appeared to occur in an epidemic manner in some places, but there are numerous places where it has appeared to be a fixture. New York, Buffalo, Troy, Gouverneur are special illustrations of this; it has been constantly present for years in those places; the records of this board do not go back to their beginning.

We reach a conclusion from this, in the meager state of our knowledge of the cause on which this disease depends, that there is some morbific principle which inheres in the locality thus affected; but we are still at a loss to say what the common conditions which favor this inherence are. It clings to large cities, and with equal persistence to rural villages. It is unknown in some cities and also over extended areas of country, where if a single case does occur it is not disposed to develop others. Now in the large city there are such complex conditions that it is necessary to reduce the problem, and to find in what part of the city and under what surroundings cases prevail. It is worthy of remark again, that, as seen in the foregoing, the northern sanitary districts, and more especially in St. Lawrence county and along the St. Lawrence river, has numerous places where the disease occurs or in which it has become domiciled; in this region a remarkable feature in common is the high level of ground water, coming as it does over extensive areas to within a very few feet of the surface and often standing in the cellars. This is the case for instance in Ogdensburgh and Gouverneur. Years ago this condition was proposed as an etiological factor of this disease, following a study of the disease in New York city. It would be well, for eradicating this disease and yet also as a sanitary relief of others as well, to try the effect of draining the soil. Possibly a good effect might follow as well in diminishing the mortality from pneumonia with which this disease has, by bacteriological investigations been associated; the relative prevalence of these two diseases coexistently has not been recorded.

Malarial diseases.

There were 842 deaths reported from these causes during 1888, and 742 during 1889. This is less than the actual number that occurred in either of the preceding years heretofore referred to; rather more than one per cent of all deaths have until this year been from malaria; in 1888 there were about 0.8 per cent, and in 1889 about 0.75. The largest proportion of these deaths occur in the fall months, when 6.0 per cent of the zymotic mortality for the two years was malarial; in the winter and spring each, there were 3.7 per cent and in the summer only about two per cent, though of course this is much lessened by the large proportion of diarrhœal diseases. There is good reason to believe that much

more than true paludal malaria is included in the reported causes of death that have to be placed under this head.

Typhoid fever.

There were 1,449 deaths from this cause in 1888, about 1.4 per cent of the total mortality, and 1,571, or 1.5 per cent of the total mortality, in 1889.

This varies but little from the proportion of the three years preceding, being a little higher than either of them. It caused a little smaller proportion of the zymotic mortality in 1888 of which deaths from this cause constituted 6.3 per cent, the average of the five years being 7.1 per cent. In 1889, however, there was a considerable increase as compared with deaths from other zymotic diseases, rising to nearly 9.0 per cent. This increase was distributed generally and not due to special epidemic prevalence. As usual the number of deaths began to increase in August, continuing to do so in September and October and then to diminish till Jauuary, the first seven months of the year being comparatively free from the disease. There has been no noteworthy epidemic of it in the State during either of the years.

Small-pox.

Until December, 1887, small-pox had been practically unknown in this State for years; at least outside of the maritime district, where, with its exposures from outside, cases may at any time appear. In 1885, in spite of the extensive epidemic which occurred in Montreal, there were but thirty-three deaths from it in this State, twenty-eight of which occurred in the metropolis. In 1886 there were thirty-nine deaths, all but two of which occurred in New York. In 1887 there were 175 deaths, 171 of which occurred in New York, Brooklyn and their immediate vicinity. In December of that year, however, there commenced a more extended occurrence of the disease in various parts of the State. In that month an outbreak began in Albany which continued until March, twenty-three cases occurring and four deaths. The origin of the epidemic was traced to Brooklyn. About the same time and from the same source probably, two fatal cases occurred near Peekskill. December tenth there arose an outbreak near Penn Yan which was contracted without doubt from imported paper mill rags, in which there were nine cases, all recovering. Early in January a single

case occurred in a remote country place, eleven miles from Waverly, Tioga county, which was brought from Potter county, Pennsylvania. Springwater, Livingston county, reported in January a single case which proved fatal, the origin of which was not traced. The same month several cases of doubtful diagnosis, all recovering, were reported from Morristown, St. Lawrence county; the first person in whom it appeared having traveled through Michigan and Wisconsin. In February, two cases of varioloid occurred in Gravesend, having originated in Brooklyn. In March, cases were reported from six localities at South East, Westchester, a single fatal case, contracted from New York; at Pleasantville, a single case, in the person of a tramp, probably contracted in New York; at Potsdam, St. Lawrence county, nine cases successively occurred, final recovery from the epidemic, the origin of which was not satisfactorily traced, not occurring until the end of May; at Richville, St. Lawrence county, two cases, one secondary to the first which proved fatal, were reported, this appears to have been brought from New York and there is reason to believe that there might have been connection between it and the Potsdam outbreak; at Saugerties two cases occurred, the first of which was in the person of a Pole recently landed from Hamburg. A single case was reported from Attica, Wyoming county, but further information of it has not been obtained. April first, at Warwick, Orange county, a case developed in the person of a laborer at Sterling mine, who had recently arrived from New York; some fifty persons were exposed, but by energetic management there was no extensive spread, although several took the disease and died. About the same time a child recently arriving at Aurelius, Cayuga county, from Brooklyn, developed small-pox, and subsequently two others in the same family took the disease, there being no spread beyond these three, one of whom died. Then in May, six localities reported cases to this office, Amenia, Dutchess county; Haverstraw, Rockland county; Monroe, Orange county; Yonkers, Sing Sing and Amsterdam. At Amenia a single case only occurred, a general vaccination being at once done; it came from New York. At Haverstraw more difficulty was experienced as the first case occurred in a street of the village crowded with foreigners, and eight or ten cases followed exposure to the first, in but three or four different households, the outbreak ending about the first of July. In the adjoining town of Clarkstown

a case developed, following willful exposure at Haverstraw; its spread there was prevented. While no clear history was obtained of the source of the epidemic, it came, with little doubt, from New York or Brooklyn. A case in the town of Monroe, near Highland Falls, Orange county, was brought from New York and developed in a family, none of whom had been vaccinated until this man came down with it, but spread was prevented by prompt vaccination, the only secondary case being in the person of the attending physician, who had a mild varioloid. At Yonkers, four persons had small-pox in May, one of whom had recently arrived from Havre; freedom from the disease was reported early in July. A single case developed in Sing Sing, ending fatally; the origin of this case was not discovered. A case reported from Amsterdam was in the person of a tramp, found sick on the street, who had been traveling with Forepaugh's circus two weeks before the outbreak of his sickness in New Jersey; no secondary cases followed. Early in June an outbreak of small-pox began in Hopkinton, St. Lawrence county, which probably is to be associated, in origin, with those of Potsdam and Richville, which have been referred to as beginning in March; it was reported as having originated at Potsdam; there were no cases reported after June. Newburgh reported two cases in June, both of which occurred independently of each other and both having originated in New York, one of the cases being a recently arrived Bohemian. This man escaped from the small-pox hospital before recovery and made his way across the river into Dutchess county, but no report has ever been received of his having communicated this disease in the course of his wanderings, nor was there further spread in Newburgh.

To this point in the history of small-pox in this State for 1888, it appears that the Metropolitan center has been the source from which these various localities have taken the disease; in some cases it was only as the entrepot from foreign parts, in others, cases have been directly contracted from existing cases, either in New York or Brooklyn. In two instances only have cases come from neighboring States. It was fortunately true that no place outside of this center, where conditions are such that the disease is hardly ever entirely absent, became a focus for spreading it, and each outbreak was promptly suppressed.

In July a new focus developed, however, in the extreme western part of the State, in the large city of Buffalo, and it is probably

from this source that most of the outbreaks occurring in the last half of the year originated. This Buffalo epidemic was set up by the arrival in that city of an immigrant from Poland, probably, and nine cases existed when the outbreak was first discovered among the Polish Jews. A large number of people were soon vaccinated in the neighborhood of its development, about 16,000 up to October, but immediate control was not effected and probably not to be expected, considering the class of people among whom the disease developed. About seventy cases occurred up to the first of October, and the epidemic continued for some time later.

At East Aurora, Erie county, a case developed September nineteenth in a person who had slept on the exposition grounds, Buffalo, and one other contracted the disease from him. The first proved fatal.

Also in the vicinity of Buffalo, in Tonawanda, and the village of North Tonawanda, cases developed soon after, one or two cases in each.

At Springville, Erie county, three cases occurred the last of September, all being convalescent, with no new cases, by the end of October.

At Marilla, Erie county, a case of varioloid occurred October twenty-sixth, which was not followed by other cases. The source of both of these outbreaks was Buffalo.

About the middle of September, small-pox developed in the Cattaraugus Indian reservation. There are in the western part of this State four of these reservations, the Tuscarora, twenty miles north of Buffalo, the Tonawanda thirty miles east, the Cattaraugus thirty miles southwest, and the Allegany, some thirty miles further south. There is also the Corn Planter reservation still further south in the State of Pennsylvania. They have in all a population of some 4,000, on or about 100 square miles of area. They are to a large degree independent of State government, the local affairs of each reservation being in their own hands, vested in either a chief or in a president and council elected annually. They are under the general supervision of the United States government, civil law being administered by Indian judges, criminal by United States and State courts. Some of the people live like whites and understand English, but many of them are pagans and live in squalor. There is much inter-communion between the different reserva-

lives, and they visit constantly the villages outside of their own domain.

Several of the Cattaraugus Reservation Indians were hired to exhibit at the International fair in Buffalo, and small-pox developed among them soon after. Being outside of the operation of the State Board of Health laws and beyond the control of the local boards of health, the coöperation of the chief of the reservation was secured and a health officer appointed who took charge of the matter, and general vaccination was effected; a quarantine against the Indians was also instituted by many of the bordering towns, as well as vaccination, and the disease fortunately did not spread beyond the reservation into the immediately surrounding country. The outbreak was limited to six cases, four of which proved fatal. No better proof could be asked for of the benefit derived from vaccination.

October eighth, report was received of the outbreak of the disease in the Allegany reservation. This reservation included within its area the village of Salamanca, just outside of which the first case appeared. A similar course was pursued here as with the Cattaraugus reservation, and November third all cases, of which there were five, had recovered or died and quarantine removed.

A single case of small-pox occurred in Albany early in November, proving fatal. It was in the person of a canal boatman from Buffalo. November seventeenth a case was discovered in Syracuse, also a canal boatman, who left Buffalo on the seventh, and who was sick several days before he was detected. Quite a number were exposed, and up to January nineteenth of the present year, ten cases had occurred, five proving fatal.

A mild case of modified small-pox occurred in Fort Edward early in December. Being on the Champlain canal, it possibly was developed through its medium, but a definite origin was not discovered.

A case occurred in Troy December fifteenth, soon proving fatal. The origin of this case was not ascertained. Two cases subsequently developed, in the same family, to which the outbreak was limited.

At Frankfort, Herkimer county, a case was detected in the person of a tramp coming from Syracuse. A second case developed in the same family where the first occurred.

At Rome, another tramp from Syracuse developed small-pox December twenty-ninth.

At Lyons, Wayne county, a case appeared December eleventh. It appears probable from subsequent investigation that this originated from clothing thrown from a canal boat, and found by the child first taken. In a short time the disease developed in five localities in and about this village, three of which came from the first case, but whether all originated from a common source was not satisfactorily determined.

This epidemic continued until some time in April, about twenty cases occurring in the village, the county alms-house, in the country near about, and at East Newark, in the neighboring town of Arcadia.

At Marengo, a case appeared December thirty-first, which originated at Lyons and proved fatal, no new cases being subsequently reported.

Syracuse was the principal point where small-pox existed at the beginning of 1889. It originated through a canal boatman from Buffalo, in November. Subsequently it broke out in the Onondaga County alms-house, near by, and the outbreak was not checked until March, a considerable number of cases and several deaths having occurred.

Malone reported two cases January twenty-third, to which number its experience was limited.

Three cases, one of them fatal, occurred in January at Wayland, Steuben county.

Four cases, originating from the Wayland case, a traveling peddler, occurred in Burns, Allegany county, in February.

From the same origin a case occurred at Dansville, Steuben county, in March.

At Sheridan, Chautauqua county, two cases occurred, the disease having been brought there from Vancouver.

A mild case which originated at Syracuse, occurred in February at Fort Plain.

At Hannibal, Oswego county, two cases occurred in March. They originated also in Syracuse.

At Geneva four cases, originating in Lyons, occurred one after another during April, two of which ended fatally.

At Starkey, Yates county, a case contracted in Geneva appeared. There were a number of exposures but no subsequent cases were reported.

This was the end of this disease until June — then a traveling case was arrested on a train of the Erie road at Binghamton and quarantined. It is extraordinary that this man should have been permitted to travel thus far from Colorado, doubtless causing the exposure of a considerable number of persons. There was no spread of the disease at Binghamton.

In Albany, however, a fellow traveler on the same car with this case broke out with the disease in July and was the means of communicating it to five others. These occurring one after another caused a continuance of the outbreak until September.

During 1889 there have been thirty deaths from small-pox, twenty of which occurred during the first two months of the year. Since September no deaths have occurred from this cause and the State is free from the existence of the disease. It exists in the States of Minnesota, Michigan, Ohio, Illinois, Tennessee and Massachusetts, and also the province of Ontario. What might be termed an epidemic prevalence which began its course in this State in December, 1887, and continued as detailed through 1888 came to its end in April 1889, about fifty localities were affected. With but few exceptions the control of the disease has been speedily accomplished in every locality where it started, it having been met with energy by the boards of health.

Periods of prevalence are followed by periods of abeyance, in good part through the general vaccination effected, and small-pox is not likely to be very prevalent for a time to come.

Measles.

In 1885 this disease caused 10.45 per 1,000 of the total mortality in 1886, 10.30; in 1887, 12.50; in 1888, 9.04, and during the winter months, ending December, 1889, 9.65. It has been thus less prevalent the last two years than usual. Very few deaths from it are being reported outside of New York and Brooklyn as the year closes. It is a disease of great variability in regard to prevalence, generally coming as it does in epidemics. Even in 1888, however, it caused four times as many deaths as small-pox, although then unusually prevalent, a fact which is well worth considering.

Whooping cough.

This is even more variable in prevalence than measles. There were 834 deaths reported from it in 1885, 1,244 in 1886, 447 in

1887, 902 in 1888, and 1,332 in 1889. It was much less prevalent during the first six months of 1888, following a year through which its mortality was very light, and an increase then begun which has continued through a good part of 1889.

Scarlet fever.

Here we have a disease of much more importance than either of those spoken of. In each 1,000 deaths, there were in 1885 14.5 from scarlet fever; in 1886 there were 11.7; in 1887 there were 13.2; in 1888 there were 22.8, and in 1889 21.2 deaths per 1,000 total mortality. It is much more prevalent and fatal as a rule in the winter and spring months, both relatively and absolutely. The necessity for quarantine and disinfection ought to be emphasized in scarlatina. If this were carefully done in every case, the spread of the disease would be greatly lessened. The same care should be used in regard to it as with small-pox, which it resembles more than any other zymotic disease in regard to the vitality and portability of its virus. It is certain to cause a great many more deaths than small-pox ever will, lacking as it does the protective procedure of vaccination and it is only to be controlled by restriction of the sick and destruction of the virus.

Diphtheria.

Of all the zymotic diseases this causes the most deaths and is far the most important to sanitary authorities. As to prevalence, there were fewer deaths from it in 1888, relatively to other deaths, than in either of the three years preceding, and still fewer in 1889. For 1885–6–7 it caused 32.35 per cent of the zymotic mortality, and in 1887, 32.20 per cent. In 1888 this proportion was reduced to 29.30 per cent, and in 1889 it has been still further reduced to 27.3 per cent. It caused a little less than six and one-half per cent of the total mortality for the twelve months of 1888, and in 1889, a little more than five and one-half per cent. It is a disease of cold weather, in the winter months of 1888 one-half of the zymotic mortality being from diphtheria, the average percentage during the winter months for the past five years being forty-four. For the three summer months for the same period only thirteen per cent were from this cause.

As to its distribution we find that deaths from diphtheria were reported from 400 of the reporting health districts which number

nearly 1,000 in 1888, and from 225 in 1889. Of the incorporated cities not one has failed to report deaths from it. In some, as Kingston, Newburgh, Long Island City and Troy, it has made up a large percentage of the deaths. It has existed as well in the most retired and rural localities. In the maritime district nearly 11 per cent of the deaths were from diphtheria in 1888, and 7.20 in 1889. In the Hudson valley district, about 6.35 per cent in 1888, and 7.25 in 1889. In the Adirondack and northern district, about 4.50 per cent in 1888, and 3.62 in 1889. In the Mohawk valley district, about 6.35 per cent in 1888, and 4.62 in 1889. In the southern tier district, about 3.40 per cent in 1888, and 4.17 in 1889. In the east central district, about 4.50 per cent in 1888, and 3.10 in 1889. In the west central district, about 2.30 in 1888, and 2.72 in 1889. And in the Lake Ontario and western district, about 5 per cent in 1888, and 4.83 in 1889. These proportions being based upon the first eleven months of the year. This gives some idea of the distribution and relative prevalence of the disease. Where there are large cities the proportion is highest, but we find it occuring and often steadily prevalent in localities the furthest removed from the conditions obtaining in the closely inhabited city.

Another fact, noteworthy, is the way it shows itself in these reporting localities. In the cities it is constantly present and seems to have become endemic. The same to a less marked degree is found to be true of some villages, even those of quite rural character. We find cases of the disease not perhaps every month, but at not long intervals, occurring. Of this numerous illustrations can be found. For example, Nassau, a village of perhaps 1,000 inhabitants, was reported upon in the annual report for 1887, as having a prevalence of the disease extending through that year, showing itself in August and again in November and December, sixteen cases occurring and three or four deaths; during 1888 it continued, to a less degree, a single death being reported in each of the months of January, June and July. This shows that the morbific principle becoming once established is liable to inhere. In further respect to which, as regards this village of Nassau, it is noteworthy in this connection that prior to 1886 the disease seems to have been unknown there, and that it was imported from an adjoining town, whither it had come from the eastward in Massachusetts. This is only an illustration, of

which other examples could be noted, of what has already been observed as a characteristic of diphtheria, that it can be imported and that being thus brought in it tends to settle and stay. The disease may, however, lose its foothold in these small towns, and again, Nassau gives an illustration of this, since for the year 1889 no cases have occurred there. This will not be found to be the case, however, in the large cities, where once established, it continues to recur for an indefinite period of time. On the other hand in rural localities, in the majority in fact, of the 400 mentioned as having reported deaths from the disease, but a single isolated case, or at least, but a single death has occurred in the course of the entire twelve months of the past year.

These facts and the general sum of the material that has come under our observation during the year regarding diphtheria are more confirmatory than original. But they help to confirm some of the opinions that are coming into acceptance. We are without doubt getting more practical ideas as to the management of the disease.

No one now, probably, doubts that diphtheria is a contagious disease; this is the first point of practical importance long held to by some and now coming into general acceptance. The medical literature of the year on diphtheria has, with hardly an exception, held exclusively this view. This is before and above all else, the means for spreading it. But it does not express all that should be said as to the conditions on which the propagation of this disease depends. It is of practical importance to consider also the bearing upon this of the environment of the disease and of its transmissible morbific principle.

Small-pox is independent of these outside conditions and will develop itself in nearly every exposed individual not protected by previous disease or vaccination, regardless of either personal conditions or of sanitary surroundings; so also will measles and to a certain degree scarlet fever and most contagious diseases. The vitality of their virus is, to be sure, affected by temperature, ventilation and the like, but they thrive just as well, probably, in sanitary surroundings as in those which are considered in a general way unsanitary.

Just as the element of personal susceptibility is of importance as an element in the spread of diphtheria, as with many of the zymotic

diseases, so we have such a thing as susceptibility of the locality affecting the prolonged existence of this disease when it has become established. In the recent literature on this subject perhaps enough emphasis has not been laid on this. In former years the investigation into the causes of an outbreak of diphtheria were chiefly limited to a search for bad sanitary conditions. In the pursuit of the study in this direction certain facts were elicited which are still true and which ought not to be forgotten.

We have found in the examination of outbreaks of the disease, that a manifest bearing has been had in the matter of soil saturation or high level of ground water. Imperfect drainage of the sites of domiciles has been proven to contribute to the development of consumption of cerebro-spinal fever; in the line of our observation it has had a more direct bearing on the development of diphtheria. It has been found that a village site has areas in which the drainage is so poor that the cellars are much of the time damp, or frequently have water standing in them, or a wet, muddy condition at the bottom. It is these areas that diphtheria selects for its development. Sometimes there is dampness enough along with imperfect ventilation to cause the growth of a mould on the sides, which has been recently suggested as having a causative relation to diphtheria; such was found to be the case in the basement of a large school-house, in the village of Walden, which took the air for its heaters from this basement.

The rationale is that those living over such cellars and basements are, for one thing, rendered thereby more likely to have sore throat, and to develop a personal susceptibility; there is also by the upward draught, induced as cool weather comes on, by closing windows and starting fires a carrying up through the house of air laden not only with moisture but with decomposing matter saturating all village soil and entering the house in solution with the water as a carrier which, in varying degree, thus reaches the higher parts of the house.

The relation of diphtheria to filth is one of considerable importance, for that it has a certain degree of dependence upon it there is no doubt. Dr. Sternberg, in his Lomb prize essay, has emphasized the fact that damp, foul places favor the development and propagation of diphtheria. No one will investigate localities

where the disease maintains a prolonged foothold without finding that its favorite place for development is the damp, dirty, ill-ventilated part of the town. It is safe to say that it will never linger in clean, well-ventilated, dry, airy parts of the place.

Diphtheria may be said to be contracted in two ways: First, it is taken by direct, personal contact with the sick or with articles infected by them; second, it may be taken by inhaling the air emanating from a spot which furnishes conditions favorable to the development and culture of its disease germs which at some previous time have become planted there. There is no reason why in a favorable culture-bed these germs should not exist and multiply just as long as the conditions continue to exist that are favorable to their growth. For instance, a sewer once having become infected with diphtheria will continue to be infected for an indefinite period, and the air given off from it will be constantly laden with the germs of the disease. For this reason it is in part that the large sewered cities when diphtheria has become established have the disease continually month after month, and there seems little prospect that they will ever become free from it. In the same way all similar conditions that exist in smaller places favor the continued recurrence of the disease if its germs once become established. And for an identical reason we find in some houses the disease breaking out again and again, not because of fresh importation of the infectious material, but because its bad sanitary condition favors the prolonged vitality of the germs and the maintenance of its foothold.

In the small place or the detached house it is entirely possible to rectify the conditions on which the perpetuation of this germ depends. Soil drainage, avoidance of its pollution, cleanliness and ventilation everywhere, not only on affected premises, but also those of a more public character, such as open drains, which are sometimes open sewers in villages, swampy sewage saturated places, are all of them unsanitary conditions, which should be removed when diphtheria should by any chance be brought to a locality, because they are conditions which favor the prolonged existence of the disease. That diphtheria may originate under these conditions apart from importation of the germ from a preëxisting case is highly improbable, the disease develops from a preëxisting case certainly, in so large a satisfactorily proven

majority of instances that the law of probabilities excludes all likelihood that it ever develops independently apart from it. This is the belief of all recent authority, with but a single exception so far as I know, an English observer, who finds it difficult to explain the occurrence of the disease in very retired localities where its importation can not by any possibility be discovered. But the law of contagion is so well established that it must be accepted as of universal application. The germs are remarkably long lived, they cling tenaciously to articles upon which they have become deposited and they may be transported for an indefinite distance and to the most retired locality by a medium that may readily escape observation.

Diphtheria presents itself to the sanitary inspector under two conditions. We find numerous cases of fulminant outbreaks, several of which have occurred during the last fall. In a place previously free from the disease, the simultaneous occurrence of a number of cases takes place. Popular attention is at once aroused and the cause inquired into. It is usually the case that these sudden outbreaks occur among children attending one school and generally one room of a school. There is but one probable cause for this sort of an outbreak, and that is direct contagion. Some infected articles have been brought into contact with these children, or else a mild undetected case of the disease or a person not fully recovered from an attack of it has brought it to them. In some way all taken sick have been exposed directly to a common carrier of the disease germs. With varying periods of incubation one after another is taken down in the course of two or three days.

The other condition under which the sanitary inspector finds diphtheria prevailing in the village or hamlet, is that in which there is a recurrence of cases one or more at a time, at intervals of some weeks perhaps, but constantly recurring for an indefinite period.

The practical point in regard to the management of these two conditions, is that in the first the primary thing to insist upon and to fix public attention upon the necessity of, is to stop the further spread of the epidemic by absolutely strict quarantine. Cut off all unnecessary communication of the sick and the well and destroy all generated infectious matter. In the second con-

dition, however, whilst quarantine and disinfection should also be insisted on, a more extended search should be made for the existence of unsanitary foci wherein the germs of the disease may be propagating, and very probably giving off to susceptible persons coming in contact with them. The problem is not one easy to solve in the sewered cities, but in small, rural localities much can be done. The appearance of the disease should be at once the signal for rectifying all unsanitary conditions, both public and domicilliary.

Diphtheria is liable to appear anywhere, in the most salubrious as well as the most unhealthy localities. The virus is carried long distances in clothing, merchandise or by persons on the railroads. No place now is so secluded or far from lines of travel as to be certain of escape from it. When it comes the question will be, shall it be limited to the few susceptible persons first exposed, or shall it open a new chapter in the health history of the place making constant contributions for an indefinite time to come. The answer can be given to some degree in advance and will depend, first on the care used in isolation of the patient, then on fumigation and destruction of the disease germs as fully as possible; and finally on the removal of everything possible which will favor the existence of the disease and the prolonged growth and multiplication of its virus whatever it may be. A disease which, for years now, has been causing one-third of the zymotic mortality, and often more than one-tenth of the total mortality, should have used against it all the resources that observation of its habits and tendencies places at our command. Circulars of instruction prepared during the last year have been issued by the board, upon not only diphtheria, but also scarlet fever and small-pox.

Diarrhœal diseases.

This is the last of the zymotic series and includes in a group of diseases diverse to some degree. The most of them are dependent upon zymotic influences. Little need be said other than to speak of the group historically.

Numerically this is by far the most important member of the zymotic class, causing more deaths than diphtheria in the course of the year. In 1885, 9.08 per cent of all diseases were due to

diarrhœa; in 1886, 8.1 per cent; in 1887, 9.6 per cent; in 1888, 8.43 per cent, and in 1889, 7.95 per cent. This shows that there is a pretty uniform death rate year by year from this class of diseases.

The number of these is greatly increased relatively to the large city population. There are in the State five cities of over 100,000 inhabitants, having an aggregate population of 2,800,000. Of the 8,765 deaths reported from the State in 1888, 6,267, or nearly three-fourths of the entire number, and about the same proportion in 1889, came from these five cities, although the population of these cities was less than half that of the entire reporting portion of the State.

Diarrhœal diseases depend on conditions more or less beyond our reach. The summer of 1887, with its remarkable prolonged duration of hot weather and saturation of the air, was characterized by an unusually high mortality from diarrhœa. In 1888 and 1889 with a general prevalence of more equable and temperate weather there were fewer deaths from this cause by more than one to each 100 total mortality. But there are many ways of lessening the mortality, which falls heavily on the children of the poor in cities, which are being put forth to some degree. It is upon the children that these diseases fall. In July, which is always the month of highest mortality from diarrhœa and which also has the highest infant death rate, nearly one-third of the deaths are from this cause, and fifty-two per cent of the deaths were of children under 5 years of age.

One point worthy of mention regarding the history of diarrhœa during 1888 was the prevalence to a remarkable degree of inflammatory diarrhœa, dysentery and the like. It prevailed especially through the central portions of the State, at least coming more from the country than the city. It lasted on into September and October. Reference to it has been made in the *Monthly Bullitens* of these months.

These are the principal facts and suggestions that have come from a study of the strictly zymotic diseases as they have occurred through the State during the year.

The following table shows, finally, the relative prevalence of the more important of these in the different sanitary districts of

the State. The maritime district has a population almost urban that of the Lake Ontario and western district is next in this respect, and the Hudson valley district next. Outside of these there are no cities of over 50,000 inhabitants except Syracuse, in the east central.

To present a comparative view of the relative prevalence year by year of the principal or more common zymotic diseases, for the last five years, the following tables have been prepared:

ZYMOTIC DISEASES.

Year.	Diseases.												
[illegible]	Percentage of zymotic to total mortality	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20.47	[illegible]	19.86
	Cerebro-spinal fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Typhoid fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Malarial diseases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Scarlet fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Measles	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Whooping cough	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Diphtheria	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Diarrheal diseases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,719	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Percentage of zymotic to total mortality	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17.46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Cerebro-spinal fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	44	[illegible]	[illegible]	[illegible]	47	[illegible]
	Typhoid fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	104	175	191	[illegible]	112
	Malarial diseases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74	118	[illegible]	[illegible]
	Scarlet fever	[illegible]	[illegible]	119	[illegible]	110	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Measles	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Whooping cough	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	49
	Diphtheria	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	618	670	[illegible]
	Diarrheal diseases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2,090	1,464	1,186	[illegible]	106	107
[illegible]	Percentage of zymotic to total mortality	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19.00
	Cerebro-spinal fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]
	Typhoid fever	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	194	248	[illegible]	149	106
	Malarial diseases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	141	104	[illegible]	78
	Scarlet fever	[illegible]	[illegible]	[illegible]	114	114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Measles	[illegible]	[illegible]	[illegible]	111	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	44
	Whooping cough	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	44	14	[illegible]	21
	Diphtheria	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	470	[illegible]	[illegible]	[illegible]	707	844	[illegible]
	Diarrheal diseases	[illegible]	[illegible]	[illegible]	112	[illegible]	[illegible]	[illegible]	2,188	1,000	207	117	78
[illegible]	Percentage of zymotic to total mortality	[illegible]	[illegible]	[illegible]	[illegible]	14.17	[illegible]	[illegible]	[illegible]	[illegible]	19.63	17.48	17.90
	Cerebro-spinal fever	[illegible]	41	40	75	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21	[illegible]
	Typhoid fever	[illegible]	[illegible]	[illegible]	45	[illegible]	[illegible]	[illegible]	174	279	[illegible]	[illegible]	[illegible]
	Malarial diseases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	40
	Scarlet fever	[illegible]	[illegible]	[illegible]	[illegible]	277	[illegible]	141	[illegible]	114	[illegible]	[illegible]	278
	Measles	[illegible]	[illegible]	[illegible]	77	[illegible]	[illegible]	111	[illegible]	43	43	171	[illegible]
	Whooping cough	[illegible]	[illegible]	[illegible]	[illegible]	40	81	[illegible]	144	142	[illegible]	[illegible]	118
	Diphtheria	[illegible]	[illegible]	[illegible]	448	[illegible]	[illegible]	411	[illegible]	[illegible]	[illegible]	[illegible]	621
	Diarrheal diseases	[illegible]	[illegible]	107	118	181	[illegible]	2,007	[illegible]	1,440	[illegible]	112	[illegible]

1889.	Percentage of zymotic to total mortality	17.03	17.00	16.75	17.42	15.59	24.18	35.22	28.07	23.42	17.70	13.96	12.63
	Cerebro-spinal fever	35	32	43	45	42	27	46	33	19	21	21	38
	Typhoid fever	89	71	69	78	63	45	117	224	247	261	169	117
	Malarial diseases	51	30	47	64	37	59	61	96	98	87	63	53
	Scarlet fever	242	324	386	363	276	154	69	54	53	57	56	73
	Measles	164	136	150	148	108	64	33	22	9	7	25	33
	Whooping cough	105	119	157	137	121	120	112	133	90	70	55	84
	Diphtheria	606	563	599	580	492	423	305	327	343	570	501	546
	Diarrhœal diseases	101	75	115	122	123	1,112	3,092	1,901	1,094	339	110	110

MORTALITY IN THE SEVERAL SANITARY DISTRICTS DURING 1888.

SANITARY DISTRICTS.	Total number of deaths.	Percentage of deaths under five years.	NUMBER OF DEATHS IN EACH 1,000. DEATHS FROM ALL CAUSES. From all zymotic diseases.	From typhoid fever.	From diarrhœal diseases.	From diphtheria.	From scarlet fever.	From consumption.
Maritime	64,421	42.5	239.50	8.66	91.58	67.95	31.23	124.10
Hudson Valley	11,015	20.4	220.88	32.22	76.18	64.27	21	114.20
Adirondack and Northern	3,435	23.9	164.48	18.34	60.55	46.57	11.35	110.91
Mohawk Valley	4,594	24	145.86	21.98	61.60	65.52	3.91	115.36
Southern Tier	3,276	21.4	163.30	28.38	54.02	34.18	10.38	100.73
East Central	4,222	22.5	187.65	28.65	72.71	43.10	9.23	110.61
West Central	2,950	14	110.61	17.28	37.28	23.38	9.15	112.20
Lake Ontario and Western	10,530	36.9	217.10	23.07	99.43	51.69	11.68	103.60
Entire State	104,443	36.7	215.11	14.18	84	61.73	23.28	118.55

MORTALITY IN THE SEVERAL SANITARY DISTRICTS DURING 1889.

SANITARY DISTRICTS.	Total number of deaths.	Percentage of deaths under five years.	From all zymotic diseases.	From typhoid fever.	From diarrhœal diseases.	From diphtheria.	From scarlet fever.	From consumption.
Maritime	65,037	42.5	224.41	9.65	86.04	63	25.54	123.20
Hudson Valley	11,106	29	209.97	23.14	61.30	65	29.17	130.92
Adirondack and Northern	3,129	23.4	148.60	23.01	62	33.87	2.87	121.76
Mohawk Valley	4,643	24.8	170.36	21.32	65.90	52.12	6.46	113.50
Southern Tier	3,300	20.1	161.06	33.92	58.11	34.54	10.03	88.49
East Central	4,290	21.4	179.72	24	80.65	33.79	12.12	110.95
West Central	2,918	15.7	123.37	19.53	46.53	27.07	7.88	110.35
Lake Ontario and Western	9,726	34	183.63	21.28	88.63	35.78	7.09	104.46
Entire State	104,239	36.7	247.91	14.86	79.56	56.12	20.15	120.01

Consumption.

mption is entitled to mention even by the most practi-
nded student of mortality rates. It causes more deaths
y other disease. It is perhaps a zymotic disease; at any
is to some extent a preventable one. In 1888 there were
deaths from it; or 118.55 in each 1,000 deaths. This is
han any year that records have been kept. Thus, in each
deaths there were, from consumption, in 1885, 139.75; in
137.66; in 1887, 120.35; in 1888, 118.55, and in 1889, 118.08.
seems to have been a steady decline year by year. The
for this can not be given. In some localities the proportion
aths is larger than in others from this cause. As a general
there are more deaths relatively in the eastern part of the
than in the central, western and southern. The maritime,
on valley and northern districts almost always have the
est death rates from consumption. The southern tier, which
des the counties along the Pennsylvania line, invariably has
wer death rate from consumption than any other section of
State.

s to season, the winter and spring months always show the
est actual and relative death rate from consumption. The
mer season is attended with the lowest mortality.

o lower the death rate for consumption no doubt one of the
tful procedures would be, as with cerebro-spinal fever and
htheria, to drain the soil upon which habitations are built.
e relation of the one to the other is well known. A study of
e comparative prevalence of these diseases by localities would
of interest and would perhaps confirm the bearing of soil satu-
tion on their continued existence. It is yet somewhat within
e regions of hypothesis how much practical result would follow
ttempts at the systematic destruction of germ-bearing sputa of
ose sick with consumption. No circular regarding that has yet
een prepared and issued by the State Board of Health.

Old age.

The causes that are given for the death of persons of advanced
age was studied in a recent report and the conclusion arrived at
that it would be fair to assume that all persons dying past 70
years of age died of old age, except those whose cause of death w s
given as the result of violence, of cancer and of zymotic disease.

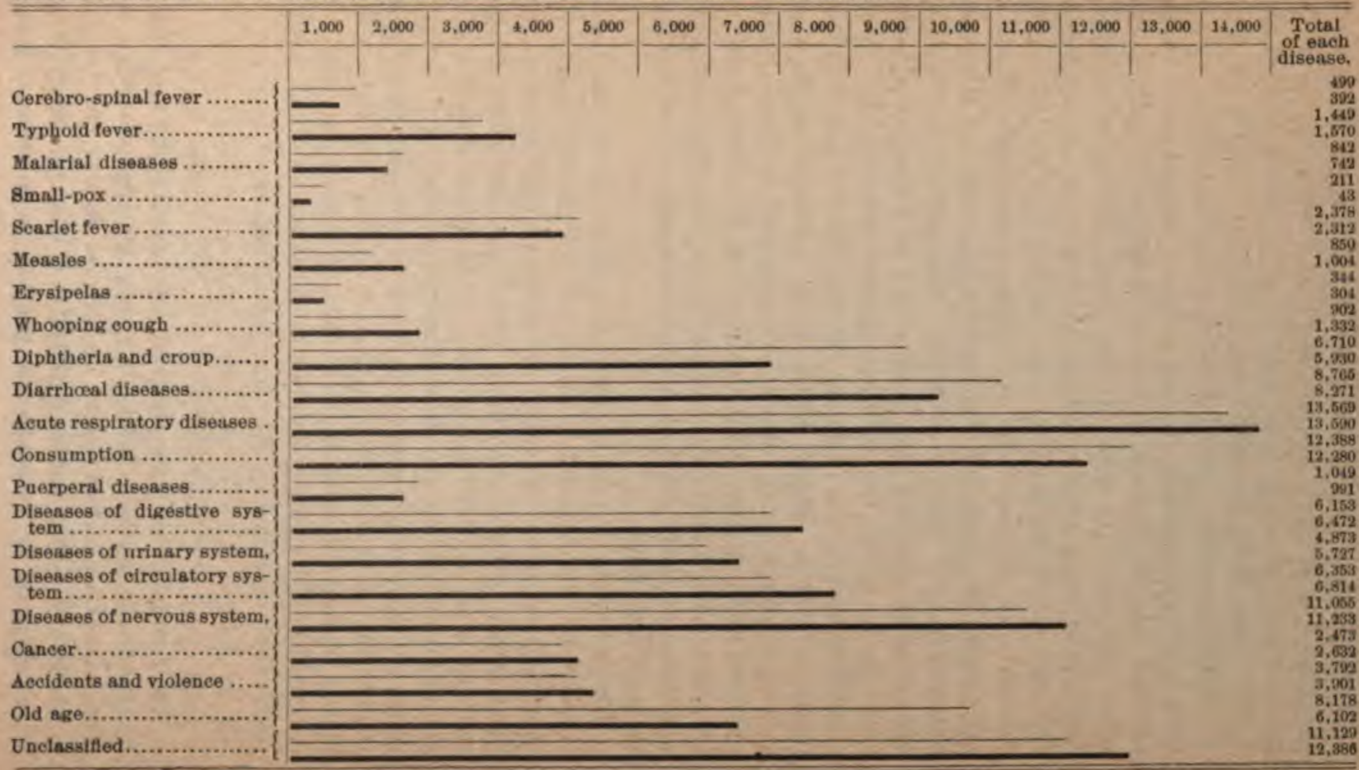
Perhaps this is too extreme, but there are few deaths so far as noted, at an age above 70 years which might not with much propriety be given as death from old age. Excepting the diseases mentioned, others usually given as the cause of death of old people, such as pneumonia, bronchitis, consumption, prostatic hypertrophy, degeneration of the organs of circulation, the various affections of the digestive organs, all so commonly appearing on the death certificates of old people are almost always the result of senile changes in them, and, in a tabulation of the movements of disease, would express the fact with more propriety if they were catalogued as senile than if placed under the lists of the various organs suffering from the alleged and doubtless existing defect. There is no more satisfactory cause of death than old age. It may be too much, perhaps, to class under it those not more than 70 years old at the time of death, with the exceptions noted, but at some later period certainly there would be great propriety in it. At the same time it is certainly true that old age comes earlier to some than to others, and this cause of death is properly given, for many who die at an earlier period of their existence It would be very desirable if in addition to note of the number of deaths under 5 years of age, records were also kept of the number dying in each locality beyond the age of 75.

SUMMARY OF MORTALITY.

At another place, earlier in this report, a table has been given of the total mortality of the State, month by month, of each class of diseases. A view of the total mortality of the State for the entire year, and of the relative proportions of each disease or group of diseases is given by the following table:

SUMMARY OF MORTALITY FOR 1888 AND 1889.

Total number of deaths from all causes, 1888, 103,969; 1889, 104,119. Deaths under five years, 1888, 38,347; 1889, 38,427. Deaths from zymotic diseases, 1888, 22,957; 1889, 21,901. (The light line represents the mortality of 1888; the dark one, 1889.)



It will be seen that the acute respiratory diseases have caused the largest mortality. Reference to the monthly table previously given, will show the periods of the year in which there is greatest fatality from these diseases; the first three months of the year considerably exceed the other months in the number of deaths, March being the month of their greatest prevalence. As yet no attempt has been made to keep separate note of pneumonia and other important diseases of this class. The number of deaths from consumption comes closely to that from acute respiratory diseases. Nervous diseases come next. This is a large group of diseases and includes some incongruous elements. Some really are senile in character fundamentally, such as atheromatous degeneration of cerebral arteries and resulting apoplexy, some are certainly reported here because the final method of death was such as to affect the nervous system although this was the secondary result of a primary disease which ought to place the death elsewhere. Many deaths from diarrhœal diseases among infants are improperly returned as congestion of the brain (the opposite of the pathological condition of the cerebral tissues), or by some other name which brings them into this category. In numerous ways the class of nervous diseases is swelled beyond its legitimate limits.

The number of deaths from the diseases of the digestive, circulatory and urinary systems are not greatly apart. Their relative proportions are much the same as they were during the three years preceding, which have been heretofore frequently referred to by way of comparison. It is noted that the class of urinary diseases has a comparatively low mortality, lower than those of either other general anatomical system. In estimating the bearing of this on the prevalence of Bright's disease though it is to be borne in mind that the class of urinary diseases includes a considerably smaller number of diseases attended with fatal result than do either of the other great classes.

Vital statistics and the death rate.

An attempt to estimate the ratio of deaths to living population for the State has been made, but only an approximation can be reached. In the first place no official census has been taken since that of 1880; consequently it has been necessary to either follow that or to estimate the present population. It is not

probable that the methods of making this estimate so elaborately carried out in the registrar-general's office for England would be productive of commensurate results for the towns of this State, however reliable it might be for computing that of the larger cities. There is nothing like the regularity of increment or decrease of population, probably, here as there. As a fact, we rely largely on estimates of present population made by local health officers, for the larger places, based on variously taken enumerations; on the school population, on directory reports and the like. Often cities are increased by territorial addition. At best our information is inexact.

From 1850 to 1860 the population of the entire State increased at the rate of nearly 80,000 a year. The next census, in 1865, covering the period of the war, showed that the population was some 50,000 less than it was five years before. Then, for the next five years, there was an increase at the rate of over 100,000 a year. Since then, 1870 to 1880, there was a yearly increase of not far from 70,000. The population in 1880 was 5,082,871. A growth at the rate of 70,000 a year would make the present population of the State about 5,720,000, and doubtless it is between that and 5,750,000, very possibly reaching the latter amount. But it is readily seen that this is a very imperfect and unsatisfactory as a datum, just as is that regarding the population of local health districts.

At the same time on the other hand, the returns of mortality can not be considered complete from many of the reporting boards. They are either never fully collected, or are sent in so irregularly as to fail of record in the *Monthly Bulletin*, even if they do finally become recorded on the record book of this office. Much improvement is being made in the vital statistics of the State and better returns are made each year. It is probable, that with the exception noted below, that the returns for the year including delayed returns are pretty complete.

The State places under the jurisdiction of the board all of the State except the cities of New York, Brooklyn, Yonkers, Albany and Buffalo. There are about 1,300 potential local boards of health which would be diminished by 100 or 200 if any considerable number of the minor villages, acting under the law, should form combined registration districts with the towns in which they are located. During 1888, death returns were received from all

of the towns except about eighty, and in 1889, from all but forty-four. These are for the most part places of less than 2,000 inhabitants. They are generally very retired, sparsely settled localities. It is estimated that the entire population of these non-returning towns is about 150,000, in 1888; and 80,000 in 1889.

Estimating the population of the entire State at 5,750,000 (which is probably at least not an overestimate, it is in round numbers placed at nearly 6,000,000), it appears that, deducting the population of non-reporting sections, we have been receiving during the year the vital statistics of about 5,600,000 population of the State. The number of death returns thus received during the year as given in the early pages of my report, including not only those received in time to be included in the Bulletin, but also the delayed returns for months being reported on, was 110,000 for 1888, and while enough delayed returns for 1889 have not been received up to the time of writing this report to make the deaths for this latter year quite equal to this, it may be assumed that the actual number of deaths for the two years is very nearly the same. This population and this number of deaths will give an annual death rate per 1,000 of 19.10 for the State. This includes the city and country alike.

Of cities there are thirty in the State, having an aggregate population, estimated to date, of nearly 3,460,000. Of the 110,000 deaths occurring in 1888, 79,500 were reported from twenty-eight of the cities, representing a population of 3,440,000, Hornellsville and Dunkirk being omitted as their returns are irregular, the latter in fact making none. Of the deaths for the entire State in 1889, 77,979 were reported by these twenty-eight cities.

The cities vary much in population and consequently in the conditions presumably favorable to large death rates. They may be divided into three classes; eight having populations of from 10,000 to 15,000; thirteen have populations of between 20,000 and 50,000, and seven from 65,000 upwards. The following tabulation, which I have here prepared, gives an idea of their relative mortality, in proportion to population, from all causes and from zymotic diseases and consumption. The estimates are on the deaths of 1888 and 1889, the month of December, 1887, being included and that of December, 1889, omitted.

DEATH RATE IN CITIES UNDER 15,000 POPULATION FOR 1888 AND 1889.

	Estimated population, 1889.	Total reported mortality, average of two years.	Annual death rate per 1,000 population.	Death rate from zymotic diseases per 1,000 population.	Death rate from consumption per 1,000 population.
Hudson	10,000	190	19.00	4.50	1.70
Ogdensburgh	12,000	232	19.33	2.83	3.00
Watertown	12,200	259	21.22	3.36	2.21
Rome	12,000	261	21.75	4.66	2.75
Lockport	15,000	162	10.80	1.06	1.00
Ithaca	10,000	145	14.00	2.20	1.20
Jamestown	14,000	206	14,71	1.50	1.50
Middletown	10,000	247	24 70	7.30	2.50

DEATH RATE IN CITIES OF FROM 20,000 TO 50,000 POPULATION FOR 1888 AND 1889.

	Estimated population, 1889.	Total reported mortality, average of two years.	Annual death rate per 1,000 population.	Death rate from zymotic diseases per 1,000 population.	Death rate from consumption per 1,000 population.
Yonkers	30,000	581	19.36	4.40	2.23
Cohoes	20,000	439	21.95	5.64	2.00
Kingston	21,000	405	19.28	6.90	2.00
Poughkeepsie	20,200	439	21.73	3.21	3.26
Newburgh	20,000	460	23.00	3.75	3.35
Long Island City	40,000	698	19.95	4.97	1.55
Schenectady	20,000	334	16.70	5.10	2.15
Amsterdam	20,000	309	15.45	6.85	1.36
Binghamton	30,000	483	16.10	2.55	1.14
Elmira	25,000	438	17.52	3.96	1.87
Auburn	26,000	426	16.38	2.65	2.55
Oswego	24,000	337	14.04	1.29	1.75
Utica	50,000	827	16.54	3.40	2.18

DEATH RATE IN CITIES OF MORE THAN 50,000 POPULATION FOR 1888 AND 1889.

	Estimated population, 1889.	Total reported mortality, average of two years.	Annual death rate per 1,000 population.	Annual death rate from zymotic diseases per 1,000 population.	Annual death rate from consumption per 1,000 population.
New York	1,571,558	40,542	25.77	6.06	3.28
Brooklyn	821,525	18,214	22.47	4.85	2.64
Albany	102,909	2,288	22.23	3.20	2.79
Troy	65,000	1,648	25.36	7.07	2.70
Syracuse	80,000	1,500	18.75	6.57	2.36
Rochester	130,000	2,189	16.76	3.07	1.11
Buffalo	230,000	4,653	20.23	3.71	1.91

TOTAL AND AVERAGE OF THE THREE TABLES.

	Total population.	Total reported mortality, average of two years.	Average death rate per 1,000 population annually.	Average death rate from zymotic diseases per 1,000 population.	Average death rate from consumption per 1,000 population annually.
Group 1	95,200	1,702	17.87	3.23	1.90
Group 2	346,200	6,172	17.83	4.03	2.05
Group 3	3,000,000	71,034	20.36	5.36	2.87

The ratio of mortality increases with the population of the city. It is generally more marked in respect to the deaths from zymotic diseases than in the total mortality, with the exception, however, of the chance prevalence of an epidemic of a zymotic disease which makes a more profound impression on the death rate of a small place than of a large one. Scarlet fever raised the zymotic death rate of Poughkeepsie and diphtheria that of Newburgh; in Troy both diphtheria and diarrhœa caused many deaths.

The increase of the death rate from consumption as the population increases is also noticeably true as is seen in the totals of the groups.

Comparing the deaths from zymotic diseases and consumption with the total mortality will show much the same proportionate

increase in larger places as is seen in comparing them with the population. Thus:

In each 1,000 deaths from all causes there were

	From zymotic diseases.	From consumption.
In group 1	153.67	105.60
In group 2	210.20	121.32
In group 3	224.60	120.00

The effect of condensation of population is hereby well seen. In the small cities, some of them hardly more than large villages, the death rate both from zymotic diseases and from consumption are very materially less than in the larger cities. In the cities of the middle group this is also true of zymotic diseases as compared with the large cities, but regarding consumption the proportion of deaths from this cause compared with the total mortality, there appears to be but little difference. Compared, however, with the population, as exhibited in the preceding tables a more correct ratio is found, since the proportion is not exaggerated by a large preponderance of the causes for death. As has been noted already, the death rate from both zymotic diseases and from consumption is increased in a nearly corresponding ratio in proportion to the diversity of population.

To contrast their rates with those of a strictly rural population the mortality of what is classed in the bulletin as "rest of districts" may be taken. Under this head are included the deaths of all smaller towns not especially noted by name in each of the sanitary districts. As they vary from month to month the task is not undertaken of finding their population, but their proportions to total mortality may be given.

Thus, in 1869, there were 16,786 deaths from all causes in these smaller towns classed as "Rest of districts." Of these 16,786 deaths there were in each 1,000 deaths from all causes:

From zymotic disease	141.07
From consumption	107.00

It thus appears that there were about twelve deaths less from zymotic diseases in these rural districts in each 1,000 deaths from all causes, the death rate from comsumption being about the same.

The death rate for the entire State for the year has been given at 19.10 per 1,000 population. That of twenty-eight cities, having an aggregate population of 3,285,000, is 24.26; this leaves 30,20 deaths for the remaining portion of the State, giving for it a death rate of 13.10. This, it must be said, includes, even after deducting the 150,000 population, from which no returns of any sort have been received in 1888, and 80,000 in 1889, places from which returns are yet imperfect. The State has, however, been rapidly improving in this respect, and these figures in themselves show a very satisfactory degree of thoroughness in this respect. With a total number of deaths for the year, reaching to nearly 19 deaths for each 1,000 of the present estimated population of the entire State, it is evident that no very large number of deaths fail of securing a record.

A work of this sort is always a growing one. The towns have to learn their duty, and in turn the people have to be instructed in theirs. It is easier to frame and execute laws that will secure the reports of deaths, than of births and marriages. Consequently they are now more complete.

Greater thoroughness is secured, evidently, in the collection of death returns than those of births and marriages. It is easier to secure the first, since the law prohibits burial without a permit, whereas a lapse of thirty days is allowed for the report of the births and marriages, and more than one person is held responsible for the report. During 1888 the certificates of about 46,000 births came to the office, and about 22,000 marriages, these coming from the State outside of the five cities excluded from the control of this board, that is from about 3,000,000 inhabitants. This gives hardly more than an annual birth-rate of fifteen per 1,000 inhabitants, and shows that hardly half of the births are being reported. As the collections of death returns approach perfection, it is probable that improvements will follow in securing those of the other returns included under the heading of vital statistics. During 1889 the certificates of about 50,252 births came to the office, and of about 24,283 marriages.

MORTALITY IN HEALTH DISTRICTS.

The following tables contain the record of each reporting local board of health for the year. In many cases the record has been kept with the town alone, this including the villages situated within it. In calculating the annual death rate per 1,000 population, in many cases an estimate of the population is made, and often it has been difficult to do this satisfactorily. It is also to be borne in mind, in comparing the death rates of different localities, that in numerous instances the reported mortality is far from complete; probably in some of them the report of deaths came from adjoining towns, there being no local board in the town itself. It should also be considered that in the small towns there is a chance for wide variation, a single death more or less making a very material difference in the death rate per 1,000 population. The larger the number of inhabitants the more uniform is likely to be the death rate.

The number of deaths here reported will not, in all cases, agree with that printed in the bulletin, being increased by delayed returns; it may also differ from that of the local registry, being increased or diminished by receipt of returns from towns which do not belong to them.

The record is limited to the principal zymotic diseases and consumption, and in estimating the healthfulness of each place these should be considered in their proportion to the total mortality.

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, FOR THE YEAR 1889.

[An asterisk (*) denotes town and village; cities are printed in SMALL CAPITALS and villages in *italics*.]

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrheal diseases.	Other zymotic diseases.	Consumption.
Adams, Jefferson county	42	18.26	....	....	....	....	1	....	....	1	3
Addison, Steuben county	45	18.00	....	....	....	....	....	....	4	....	2
Afton, Chenango county	23	10.22	....	2	....	....	....	....	1	....	3
Alabama, Genesee county	24	12.00	....	....	....	....	....	2	....	1	....
ALBANY, Albany county	2,262	21.96	20	77	5	....	64	79	79	28	204
Albion,* Orleans county	58	9.66	1	2	....	....	....	5	....	....	4
Albion, Oswego county	78	30.00	1	....	....	....	....	3	7	1	10
Alden, Erie county	46	19.16	....	....	....	....	2	2	1	1	3
Alexander,* Genesee county	15	9.37	....	....	....	....	....	....	....	....	....
Alexandria, Jefferson county	28	8.88	....	1	....	....	....	1	....	....	....
Alfred, Allegany county	21	13.72	....	1	....	....	....	....	1	....	1
Allegany, Cattaraugus county	50	12.24	2	....	....	....	5	....	2	....	3
Allen, Allegany county	4	5.00	....	....	....	....	....	....	....	....	....
Alma, Allegany county	2	2.31	....	....	....	....	....	....	....	....	....
Almond, Allegany county	11	7.00	....	....	....	....	....	....	....	....	2
Altona, Clinton county	2	.56	....	....	....	....	....	....	....	....	....
Amboy, Oswego county	12	9.60	....	....	....	....	....	....	....	....	1
Amenia, Dutchess county	30	11.11	....	1	....	....	....	....	....	....	5
Amherst, Erie county	48	10.47	....	1	....	....	....	....	....	....	6
Amity, Allegany county	11	5.50	....	....	....	....	....	....	....	....	1
AMSTERDAM, Montgomery county	333	16.65	2	5	....	....	6	47	24	16	27

Amsterdam, Montgomery county	25	25.00	....	....	....	...	...	...	....	1	...
Ancram, Columbia county	11	6.87	....	....	....	...	...	1	...	....	...
Andes, Delaware county	17	6.43	....	....	....	...	...	....	1	....	...
Andover, Allegany county	28	14.00	...	...	....	...	...	....	1	....	2
Angelica, Allegany county	30	18.51	....	....	....	...	...	....	1	....	1
Annsville, Oneida county	31	8.73	....	....	....	...	...	....	2	....	2
Antwerp, Jefferson county	29	8.49	....	1	...	...	...	....	....	....	5
Arcade,* Wyoming county	26	13.00	....	....	...	...	...	....	1	....	3
Arcadia, Wayne county	34	15.45	....	1	....	...	...	....	1	....	3
Argyle, Washington county	39	14.02	....	....	1	...	...	....	2	2	8
Arietta, Hamilton county	......	......	....	....	....	...	...	....	....	....	...
Arkwright, Chautauqua county	5	4.63	....	....	....	...	...	....	....	....	...
Ashford, Cattaraugus county	5	2.75	...	....	....	...	...	...	...	....	...
Ashland, Chemung county	11	9.65	....	....	....	...	...	....	....	....	...
Ashland, Greene county	10	11.11	....	....	....	...	...	....	....	....	3
Athens, Greene county	5	1.16	....	....	....	...	...	...	....	....	1
Attica, Wyoming county	26	8.38	....	....	....	...	...	1	....	....	...
AUBURN, Cayuga county	451	17.34	4	6	4	...	4	29	25	4	66
Augusta, Oneida county	28	12.90	....	1	....	...	...	....	1	....	1
Aurelius, Cayuga county	21	10.71	....	....	....	...	...	1	1	....	4
Aurora,* Erie county	37	13.60	....	3	....	...	1	....	....	....	3
Ausable, Clinton county	25	11.36	1	....	....	...	...	....	....	....	2
Austerlitz, Columbia county	24	17.91	1	1	....	...	2	....	....	....	...
Ava, Oneida county	5	4.80	....	....	....	...	...	....	....	....	1
Avoca, Steuben county	18	9.78	....	2	....	...	...	5	....	....	1
Avon,* Livingston county	38	10.98	....	....	....	...	...	....	....	....	4
Babylon, Suffolk county	107	22.57	1	1	....	...	...	4	6	2	13
Bainbridge,* Chenango county	31	16.07	1	1	....	...	...	....	2	....	4
Baldwin, Chemung county	10	10.30	....	1	....	...	...	....	....	....	...
Baldwinsville, Onondaga county	42	14.00	....	....	2	...	...	1	5	....	6
Ballston, Saratoga county	21	10.29	....	....	....	...	1	1	....	....	1

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhoeal diseases.	Other zymotic diseases.	Consumption.
Ballston Spa, Saratoga county	61	19.06	3	3	....	...	...	....	4	....	10
Bangor, Franklin county	20	8.19	....	....	....	...	...	1	....	....	4
Barker, Broome county	12	9.00	....	....	....	...	...	....	...	....	...
Barre, Orleans county	27	11.58	....	2	....	...	...	....	....	1	1
Barrington, Yates county	4	2.70	....	1	...	...	...	...	....	....	1
Barton, Tioga county	44	7.53	....	1	....	...	...	....	1	1	5
Batavia, Genesee county	6	6.00	1	...	....	...	...	....	....	...	1
Batavia, Genesee county	82	11.71	....	2	3	...	...	....	5	1	10
Bath, Steuben county	86	22.05	....	....	....	...	...	....	1	...	12
Bath, Steuben county	52	14.85	....	1	....	...	...	1	2	....	7
Bedford,* Westchester county	27	7.26	....	....	....	...	...	3	1	1	4
Beekman, Dutchess county	21	13.28	....	...	....	...	1	1	....	....	2
Beekmantown, Clinton county	22	8.33	...	....	....	...	...	....	4	....	2
Belfast, Allegany county	8	5.44	....	....	....	...	...	....	....	....	...
Bellmont,* Franklin county	25	11.90	....	....	....	...	...	2	....	1	2
Bennington, Wyoming county	......	......	....	....	....	...	...	...	....	....	...
Benson, Hamilton county	2	5.00	....	....	....	...	...	....	....	....	...
Benton, Yates county	26	10.74	....	...	....	...	...	....	....	....	1
Bergen,* Genesee county	22	11.00	....	1	....	...	...	....	....	....	4
Berkshire, Tioga county	20	15.38	....	....	....	...	...	....	....	....	1
Berlin, Rensselaer county	20	9.09	....	....	....	...	1	....	....	....	...

Berne, Albany county	26	9.92							1		4
Bethany, Genesee county	18	10.77							1		
Bethel, Sullivan county	30	11.71		1			1		1		2
Bethlehem, Albany county	58	15.46		3				2	6		7
Big Flats, Chemung county	9	4.50									
BINGHAMTON, Broome county	465	15.50	1	34	4		2	6	23	3	34
Binghamton, Broome county	118	46.09		3			1		6		6
Birdsall, Allegany county	12	13.33									
Black Brook, Clinton county	20	5.86							1		2
Bleecker, Fulton county	12	11.43	1								
Blenheim, Schoharie county	12	10.00									1
Blooming Grove, Orange county	31	12.65					3				4
Bolivar,* Allegany county	10	9.70									
Bolton, Warren county	17	15.04					1				1
Bombay, Franklin county	11	6.70								2	2
Boonville,* Oneida county	74	18.50	1	2					2		5
Boston, Erie county	23	14.19							1		
Bovina, Delaware county	9	9.00									1
Boylston, Oswego county	9	7.03									
Bradford, Steuben county	....	......									
Brandon, Franklin county	7	8.53						1			2
Brandt, Erie county	12	7.84							2		1
Brasher, St. Lawrence county	6	1.67						2			
Bridgewater, Oneida county	5	4.09									
Brighton, Franklin county	2	7.40									
Brighton,* Monroe county	119	31.73		4	1			1	2		14
Bristol, Ontario county	25	15.15		2					1		
Broadalbin, Fulton county	38	17.51							2		6
Brockport, Monroe county	42	9.33		3					1		5
Brookfield, Madison county	49	13.29		1				5	1		3
Brookhaven, Suffolk county	207	18.02		5				2	12	1	16

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. (Continued).

NAME OF PLACE.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Brooklyn, Kings county	18,480	22.49		101	181		273	1,400	1,320	631	2101
Broome, Schoharie county	3	1.82									
Brownville,[1] Jefferson county	15	15.94							6		8
Brunswick, Rensselaer county	11	12.61		2				2		1	1
Brutus, Cayuga county	31	12.40							1		1
BUFFALO, Erie county	1,330	15.82	59	73	16		17	10	143	91	480
Burke, Franklin county	20	9.21						1	2		2
Burlington, Otsego county	15	9.37									2
Burns, Allegany county	15	8.93				1			1		
Busti, Chautauqua county	19	10.00							1		2
Butler, Wayne county	12	5.09									2
Butternuts, Otsego county	17	8.33							1		2
Byron, Genesee county	34	19.12		1				2	8		5
Cairo, Greene county	39	13.00									2
Caldwell, Warren county	25	20.40			1				3		2
Caledonia, Livingston county	21	12.95									2
Callicoon, Sullivan county	28	12.84									5
Cambria, Niagara county	18	7.92			1		1				
Cambridge,* Washington county	42	18.10	1	1							
Camden,* Oneida county	55	16.17	1	1				2	1		2
Cameron, Steuben county	14	8.75	1	1				1	2		2

Camillus,* Onondaga county	30	12.42	....	1	....	...	3	....	1	....	...
Campbell, Steuben county	5	2.65	....	....	....	...	...	....	....	....	...
Canaan, Columbia county	23	17.16	....	1	....	...	...	....	....	....	2
Canadice, Ontario county	8	8.88	....	....	....	...	...	....	....	....	1
Canajoharie,* Montgomery county	34	26.15	....	..	....	...	...	....	....	....	4
Canandaigua, Ontario county	17	8.09	....	2	....	...	...	....	....	....	1
Canandaigua, Ontario county	50	7.93	...	2	....	...	...	....	1	1	7
Candor, Tioga county	66	15.26	....	2	....	...	...	1	10	....	5
Caneadea, Allegany county	13	7.36	....	....	....	...	...	....	2	....	1
Canisteo, Steuben county	2	.54	....	....	....	...	...	....	....	....	...
Canton, St. Lawrence county	12	1.91	....	....	....	...	...	2	....	....	1
Cape Vincent,* Jefferson county	35	11.12	....	...	....	...	...	....	3	....	1
Carlisle, Schoharie county	18	10.46	....	1	....	...	...	....	....	....	...
Carlton, Orleans county	6	2.41	....	....	....	...	...	....	....	....	...
Carmel, Putnam county	43	15.30	....	....	....	...	...	2	1	....	3
Caroga, Fulton county	4	4.70	....	....	....	...	...	....	....	....	...
Caroline, Tompkins county	14	6.45	....	....	....	...	...	....	1	....	...
Carrol, Chautauqua county	32	18.60	...	....	....	...	...	3	1	....	1
Carrolton, Cattaraugus county	4	1.84	....	....	....	...	...	....	....	....	...
Castile,* Wyoming county	34	14.68	....	2	....	...	...	....	....	....	3
Catharine, Schuyler county	22	13.58	....	....	....	...	...	...	....	....	...
Catlin, Chemung county	9	6.20	....	....	....	...	...	....	....	....	...
Cato,* Cayuga county	28	13 59	1	1	....	...	1	....	1	....	3
Caton, Steuben county	10	6.09	....	1	....	...	1	....	1	....	...
Catskill, Greene county	46	11.50	...	....	....	...	...	....	2	1	2
Catskill, Greene county	88	19.55	1	....	1	...	...	1	4	2	15
Cayuta, Schuyler county	6	10.00	....	....	....	...	...	....	....	....	...
Cazenovia,* Madison county	76	15.12	1	....	....	...	...	4	9	....	7
Centreville, Allegany county	17	17.70	....	....	....	...	...	...	....	1	1
Champion, Jefferson county	20	8.84	....	1	....	...	...	1	....	1	1
Champlain,* Clinton county	33	6.09	....	....	....	...	...	....	2	1	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Constable, Franklin county	16	10.45	....	....	....	...	...	....	1	...	...
Constantia, Oswego county	6	1.92	....	....	....	...	...	....	...	....	1
Cooperstown, Otsego county	32	10.66	....	1	....	...	...	....	1	...	...
Copake, Columbia county	30	15.78	....	2	...	...	...	....	....	....	1
Corinth, Saratoga county	24	13.95	....	1	....	...	...	1	....	1	1
Corning,* Steuben county	128	16.00	....	3	1	...	...	8	6	1	14
Cornwall, Orange county	37	9.64	....	3	....	...	...	....	1	....	4
Cortland, Cortland county	133	14.77	1	7	1	...	...	....	1	....	13
Cortlandt, Westchester county	130	10.26	....	....	....	...	9	3	3	....	15
Cortlandville, Cortland county	55	27.50	1	5	....	...	...	...	1	....	1
Coventry, Chenango county	17	12.92	....	....	....	...	...	6	....	....	1
Covert, Seneca county	19	8.77	....	....	....	...	...	....	....	....	1
Covington, Wyoming county	7	5.97	....	....	....	...	...	....	1	....	...
Coxsackie,* Greene county	75	18.75	....	1	....	...	4	....	3	....	10
Crawford, Orange county	13	6.66	....	....	....	...	...	....	....	....	3
Croghan, Lewis county	19	5.58	....	....	....	...	...	....	1	....	...
Crown Point, Essex county	26	6.04	1	1	....	...	...	....	....	....	...
Cuba,* Allegany county	7	3.18	....	....	....	...	...	....	1	....	...
Cuyler, Cortland county	19	13.57	....	....	....	...	...	....	....	....	...
Danby, Tompkins county	1	.48	....	....	....	...	...	....	....	....	...
Dannemora, Clinton county	13	4.39	....	...	....	...	...	....	....	....	6

Dansville, Steuben county	14	7.77	....	1	....	...	...	....	1	....	...
Danube, Herkimer county	3	2.42	....	1	....	...	...	....	....	....	...
Darien, Genesee county	13	6.34	....	....	....	...	...	....	....	....	...
Davenport, Delaware county	22	11.34	....	....	....	...	...	....	....	....	...
Day, Saratoga county	10	8.06	....	....	....	...	...	1	1	....	...
Dayton, Cattaraugus county	20	11.58	....	2	....	...	...	....	....	....	...
Decatur, Otsego county	4	5.00	....	....	....	...	...	....	....	....	...
Deerfield, Oneida county	19	9.04	....	1	....	...	...	1	....	....	2
Deerpark, Orange county	38	19.00	2	3	....	...	...	....	....	....	3
DeKalb, St. Lawrence county	27	8.92	....	1	....	...	...	....	....	....	3
Delaware, Sullivan county	6	3.27	....	....	....	...	...	...	....	....	1
Delhi,* Delaware county	37	12.33	....	...	....	...	2	1	....	....	3
Denmark, Lewis county	23	10.45	....	1	....	...	...	....	....	....	...
Denning, Ulster county	2	1.93	....	....	....	...	...	....	....	....	...
Deposit,* Delaware county	24	13.99	....	....	....	...	...	....	...	...	1
DePeyster, St. Lawrence county	10	8.33	....	....	....	...	...	....	....	....	...
DeRuyter,* Madison county	24	15.00	...	1	....	...	...	....	....	....	...
DeWitt, Onondaga county	64	16.00	....	....	....	...	...	2	1	1	4
Diana, Lewis county	29	14.32	1	1	....	...	...	1	....	....	1
Dickinson, Franklin county	4	1.70	....	....	....	...	...	....	....	....	...
Dix, Schuyler county	45	10.79	...	....	....	...	...	....	1	....	3
Dover, Dutchess county	23	10.00	....	....	....	...	...	2	....	....	1
Dresden, Washington county	11	15.06	....	....	....	...	...	1	....	....	...
Dryden,* Tompkins county	16	3.90	....	....	....	...	...	....	...	....	1
Duane, Franklin county	6	21.05	....	....	....	...	...	....	....	....	1
Duanesburgh, Schenectady county ..	16	7.61	....	....	....	...	...	....	....	2	1
DUNKIRK, Chautauqua county	......	......	....	....	....	...	...	....	....	....	...
Durham, Greene county	23	10.57	....	....	....	...	...	1	1	....	3
Eagle, Wyoming county	14	11.66	....	....	....	...	...	....	....	....	...
East Bloomfield, Ontario county	3	1.18	....	....	....	...	...	....	....	....	...
East Chester, Westchester county ...	212	56.76	....	4	....	...	5	20	15	4	17

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC.—(Continued).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
East Fishkill, Dutchess county......	19	7.46	....	....	....	...	...	....	....	....	3
East Greenbush, Rensselaer county..	45	20.93	....	....	1	...	...	1	....	....	1
East Hamburgh, Erie county	41	17.01	....	...	....	...	...	...	2	....	3
Easthampton, Suffolk county........	32	12.72	....	....	....	...	...	...	....	....	2
Easton, Washington county.........	26	9.48	....	....	....	...	1	....	1	....	5
East Otto, Cattaraugus county......	8	6.34	....	1	....	...	...	....	....	....	...
Eaton, Madison county.............	53	13.94	....	....	....	...	...	1	2	....	3
Eden, Erie county	20	8.45	....	....	....	...	...	....	....	....	...
Edgewater, Richmond county........	342	28.50	1	3	1	...	2	19	23	3	53
Edinburgh, Saratoga county........	13	8.52	....	....	...	...	1	....	....	....	...
Edmeston, Otsego county	22	12.22	....	....	....	...	...	2	2	....	...
Edwards, St. Lawrence county......	15	13.63	....	2	....	...	...	....	....	....	...
Elba,* Genesee county	21	10.65	....	....	....	...	...	....	....	....	1
Elbridge, Onondaga county	64	15.60	....	2	2	...	...	10	1	....	7
Elizabethtown,* Essex county.......	22	16.11	....	....	....	...	...	....	3	....	...
Ellenburgh, Clinton county....	12	3.75	....	....	....	...	...	....	2	....	1
Ellenville, Ulster county............	32	10.66	....	1	2	...	..	1	....	...	5
Ellery, Chautauqua............... .	11	7.07	....	....	...	...	...	....	....	....	...
Ellicott, Chautauqua county	13	6.50	....	1	....	...	...	....	....	....	...
Ellicottville,* Cattaraugus county ...	35	17.94	1	....	....	...	...	....	2	....	2
Ellington, Chautauqua county	9	5.62	....	....	....	...	...	....	....	....	2

Ellisburgh, Jefferson county	75	15.58	....	2	....	...	...	....	3	....	5
Elma, Erie	28	10.95	....	....	....	...	...	4	....	....	2
ELMIRA, Chemung county	455	18.20	2	16	2	...	7	39	40	8	45
Elmira, Chemung county	27	13.50	....	3	....	...	...	....	1	....	8
Enfield, Tompkins county	9	5.29	....	....	....	...	...	....	....	....	...
Ephratah, Fulton county	9	4.11	....	1	....	...	...	....	....	....	...
Erin, Chemung county	9	5.76	....	....	....	...	...	....	....	....	1
Erwin, Steuben county	23	10.95	....	2	....	...	...	....	....	....	...
Esopus, Ulster county	90	19.02	2	4	2	...	...	17	4	3	8
Esperance,* Schoharie county	12	8.69	....	....	....	...	1	....	....	....	...
Essex, Essex county	16	10.95	....	....	....	...	...	....	1	....	...
Evans, Erie county	42	16.15	....	1	....	...	2	1	2	....	4
Exeter, Otsego county	20	14.07	....	1	....	...	...	....	2	....	1
Fabius,* Onondaga county	22	10.62	....	....	....	...	...	....	1	....	1
Fairfield, Herkimer county	8	4.83	....	....	....	...	...	....	....	....	...
Fallsburgh, Sullivan county	24	8.00	....	....	....	...	1	2	4	....	...
Farmersville, Cattaraugus county	10	4.69	....	....	....	...	...	....	....	....	1
Farmington, Ontario county	8	4.00	....	1	....	...	...	1	....	....	...
Fayette, Seneca county	38	11.46	1	....	....	...	...	3	....	....	2
Fenner, Madison county	14	11.02	1	2	....	...	...	....	....	....	...
Fenton, Broome county	21	13.50	....	....	....	...	...	....	1	....	2
Fine, St. Lawrence county	4	4.00	....	....	....	...	...	....	....	....	...
Fishkill, Dutchess county	204	19.00	1	1	....	...	3	9	18	1	24
Flatbush, Kings county	878	109.75	....	17	3	...	4	32	37	5	122
Flatlands, Kings county	63	20.16	....	1	....	...	...	5	....	2	3
Fleming, Cayuga county	15	12.14	....	....	....	...	...	....	1	....	1
Florence, Oneida county	27	12.85	....	....	....	...	...	1	2	....	3
Florida, Montgomery county	20	8.88	....	1	....	...	...	....	1	....	1
Floyd, Oneida county	4	3.58	....	....	....	...	...	....	....	....	2
Flushing,* Queens county	315	13.43	....	4	3	...	21	4	20	5	28
Forestburgh, Sullivan county	2	1.88	....	....	....	...	...	....	....	....	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. (Continued).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro-spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrheal diseases.	Puerperal fever.	Consumption.
Forestport, Oneida county	21	17.61	1	....	....	...	...	....	2	....	3
Fort Ann,* Washington county	38	11.61	....	1	....	...	...	....	....	1	3
Fort Covington, Franklin county	27	11.13	....	1	....	...	...	..	....	....	5
Fort Edward,* Washington county	52	10.65	....	....	....	...	...	2	5	1	12
Fowler, St. Lawrence county	15	9.37	....	....	....	...	...	...	2	....	..
Franklin,* Delaware county	36	12.37	1	....	....	...	...	....	1	1	1
Franklinville,* Cattaraugus county	62	31.00	....	1	....	...	2	2	1	1	6
Frankfort, Herkimer county	43	14.21	....	....	....	...	...	1	2	....	4
Fredonia, Chautauqua county	44	15.71	....	....	1	...	...	....	3	1	5
Freedom, Cattaraugus county	17	12.92	....	....	....	...	...	....	....	....	1
Freetown, Cortland county	5	6.25	....	....	....	...	...	....	....	....	...
Fremont, Sullivan county	3	1.18	....	....	....	...	...	...	....	....	...
French Creek, Chautauqua county	3	2.88	....	....	....	...	...	....	...	....	1
Friendship, Allegany county	16	7.52	....	....	....	...	...	....	....	....	...
Fulton, Schoharie county	34	12.59	1	1	....	...	...	....	....	...	3
Fulton, Oswego county	22	5.50	....	1	....	...	...	....	....	....	3
Gaines, Orleans county	38	11.34	....	....	...	...	...	2	1	..	9
Gainesville, Wyoming county	30	16.66	....	1	....	...	...	...	....	...	1
Galen, Wayne county	27	10.97	....	....	...	1	...	1	....	....	...
Gallatin, Columbia county	11	8.80	....	....	....	...	...	....	....	....	...
Galway,* Saratoga county	19	10.00	....	...	...	...	...	1	....	....	2

Gardiner, Ulster county	16	8.88	....	....	....	...	...	1	....	....	...
Gates, Monroe county	18	9.00	....	....	....	...	...	....	2	....	2
Geddes, Onondaga county	11	4.40	....	....	....	...	...	....	2	....	1
Genesee, Allegany county	1	1.02	....	....	....	...	...	....	....	....	...
Genesee Falls, Wyoming county	3	3.48	....	....	....	...	1	....	....	....	...
Geneseo,* Livingston county	21	12.27	....	....	....	...	...	....	1	....	2
Geneva, Ontario county	15	10.00	....	....	....	...	...	....	3	....	...
Geneva, Ontario county	104	17.33	1	2	2	2	...	....	2	....	15
Genoa, Cayuga county	7	2.82	....	....	....	...	...	....	....	....	...
Georgetown, Madison county	15	10.00	....	....	....	...	...	....	....	....	...
German, Chenango county	5	7.69	....	....	....	...	...	....	1	....	...
German Flats, Herkimer county	7	1.03	....	....	....	...	...	....	1	....	...
Germantown, Columbia county	28	17.39	....	2	....	...	1	....	1	....	2
Gerry, Chautauqua county	10	8.33	....	....	....	...	...	....	....	....	...
Ghent, Columbia county	42	14.21	....	....	....	...	...	....	1	1	3
Gilboa, Schoharie county	18	8.82	....	1	....	...	...	....	....	....	1
Glen, Montgomery county	28	10.68	....	....	....	...	...	....	....	....	2
Glens Falls, Washington county	165	16.50	2	3	2	...	...	6	15	4	19
Glenville, Schenectady county	28	10.18	....	1	....	...	...	....	....	....	2
Gloversville, Fulton county	203	20.30	1	4	....	...	2	6	16	4	15
Gorham, Ontario county	14	5.55	....	....	....	...	...	....	....	....	2
Goshen, Orange county	97	22.12	1	1	1	...	10	6	2	....	10
Gouverneur, St. Lawrence county	93	16.88	3	10	....	...	...	3	2	2	10
Grafton, Rensselaer county	16	9.55	....	1	....	...	...	....	1	....	2
Granby, Oswego county	58	12.84	1	....	1	...	2	....	....	....	5
Grand Island, Erie county	6	5.17	....	1	....	...	...	....	....	....	...
Granger, Allegany county	8	6.95	....	1	....	...	...	....	1	....	...
Granville,* Washington county	68	16.38	....	1	....	...	...	....	1	1	6
Gravesend, Kings county	133	13.30	....	3	2	...	1	4	17	1	7
Great Valley, Cattaraugus county	18	9.67	....	....	....	...	...	....	....	....	...
Greece, Monroe county	42	8.67	....	1	....	...	...	1	1	1	2

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued.*)

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Greenburgh, Westchester county	165	18.46	....	3	....	...	5	7	5	....	12
Greenbush, Rensselaer county	179	22.37	2	13	....	...	10	13	3	2	14
Greene,* Chenango county	59	17.45	....	1	....	...	...	7	....	....	4
Greenfield, Saratoga county	28	11.42	....	1	....	...	...	1	1	....	1
Green Island, Albany county	82	16.40	1	3	...	...	...	12	8	4	11
Greenport, Columbia county	16	12.54	....	....	....	...	...	....	1	....	1
Greenville, Greene county	27	13.20	....	1	1	...	...	....	....	....	2
Greenville, Orange county	......	......	....	....	....	...	...	....	....	....	...
Greenwich,* Washington county	85	21.15	....	3	....	...	...	2	4	....	14
Greenwood, Steuben county	19	13.57	....	....	....	...	...	....	2	....	...
Greig Lewis county	11	7.00	....	....	....	...	...	....	1	....	1
Groton * Tompkins county	36	10.43	....	1	....	...	...	....	....	....	1
Grove, Allegany county	13	11.55	....	....	...	...	...	....	1	....	1
Groveland, Livingston county	15	11.19	....	....	....	...	...	....	1	....	...
Guilderland, Albany county	20	5.49	....	1	....	...	...	....	....	....	2
Guilford, Chenango county	33	13.52	....	....	....	...	...	...	....	....	1
Hadley, Saratoga county	2	1.81	....	....	....	...	...	....	....	....	...
Hague, Warren county	6	7.40	....	....	....	...	...	....	....	....	...
Halcott, Greene county	28	70.00	....	...	....	...	...	..	....	1	2
Halfmoon, Saratoga county	45	14.51	1	2	....	...	...	....	....	....	4
Hamburgh,* Erie county	36	11.12	...	....	....	...	...	2	4	...	2

Hamden, Delaware county	21	14.00	....	1	....	....	2	....	....	....	1
Hamilton,* Madison county	67	17.13	1	1	....	....	....	....	4	4	2
Hamlin, Monroe county	3	1.20	....	....	....	....	....	....	....	....	....
Hammond, St. Lawrence county	21	11.29	....	....	....	....	....	....	....	....	....
Hampton, Washington county	11	13.17	....	1	....	....	....	....	2	....	....
Hamptonburgh, Orange county	......	......	....	....	....	....	....	....	....	....	....
Hancock, Delaware county	7	2.16	....	1	....	....	....	....	....	....	1
Hannibal,* Oswego county	15	4.72	....	....	....	2	....	....	....	....	....
Hanover, Chautauqua county	26	6.16	....	....	....	....	....	....	1	....	1
Hardenburgh, Ulster county	3	3.75	....	....	....	....	....	....	....	....	....
Harford, Cortland county	14	13.52	....	....	....	....	....	....	....	....	1
Harmony, Chautauqua county	16	4.63	....	....	....	....	1	....	....	....	....
Harpersfield, Delaware county	16	11.26	....	....	....	....	....	....	....	....	1
Harrietstown, Franklin county	8	14.95	....	....	....	....	....	....	....	....	4
Harrisburgh, Lewis county	3	2.72	....	....	....	....	....	....	....	....	....
Harrison, Westchester county	16	10.66	....	....	....	....	....	....	....	....	....
Hartford, Washington county	40	22.72	....	....	....	....	1	....	1	1	1
Hartland, Niagara county	30	8.98	....	....	....	....	....	....	....	....	1
Hartsville, Steuben county	......	......	....	....	....	....	....	....	....	....	....
Hartwick, Otsego county	16	6.83	....	1	....	....	....	....	....	....	....
Hastings, Oswego county	45	11.53	....	1	....	....	....	....	1	....	....
Haverstraw,* Rockland county	229	32.71	....	2	2	....	25	28	13	2	18
Hebron, Washington county	18	7.50	....	....	....	....	....	1	....	....	1
Hector, Schuyler county	34	6.80	....	1	....	....	....	2	....	....	8
Hempstead,* Queens county	358	19.33	....	1	1	....	5	13	25	9	28
Henderson, Jefferson county	16	8.64	....	....	....	....	....	....	....	....	....
Henrietta, Monroe county	17	7.55	....	....	....	....	....	1	....	....	3
Herkimer,* Herkimer county	47	11.75	....	2	....	....	....	1	....	....	5
Hermon,* St. Lawrence county	16	10.00	....	....	....	....	....	....	....	....	....
Highlands, Orange county	56	16.47	....	2	....	....	....	3	3	....	3
Highlands, Sullivan county	23	22.66	1	....	....	....	....	....	....	....	....

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
High Market, Lewis county	6	6.38	....	....	....	...	...	....	....	....	...
Hillsdale, Columbia county	37	18.50	....	....	....	...	...	1	....	....	4
Hinsdale, Cattaraugus county	13	8.12	....	....	....	...	...	....	....	....	1
Holland, Erie county	20	11.62	....	....	....	...	...	...	1	....	1
Homer,* Cortland county	73	18.25	1	3	....	...	2	1	1	....	8
Hoosick, Rensselaer county	32	16.00	...	....	....	...	...	3	....	....	5
Hoosick Falls, Rensselaer county	131	21.83	....	1	....	...	...	22	7	....	21
Hope, Hamilton county	......	.....	....	....	....	...	...	....	....	....	...
Hopewell, Ontario county	25	13.16	1	1	....	...	...	....	....	....	...
Hopkinton, St. Lawrence county	13	6.84	....	....	....	...	...	....	....	....	...
Horicon, Warren county	11	6.72	....	....	....	...	...	....	2	1	...
Hornby, Steuben county	8	6.66	....	....	....	...	...	....	1	....	...
HORNELLSVILLE, Steuben county	34	3.40	....	....	....	...	...	....	....	....	3
Hornellsville, Steuben county	9	7.50	....	....	1	...	...	...	1	....	...
Horseheads,* Chemung county	43	12.28	....	....	....	1	6	1	2	1	1
Hounsfield, Jefferson county	40	14.28	....	....	....	...	1	3	1	....	1
Howard, Steuben county	4	9.38	....	....	....	...	...	....	....	....	...
HUDSON, Columbia county	207	20.70	....	1	4	...	4	14	21	1	16
Hume, Allegany county	20	10.52	....	2	....	...	...	....	....	1	1
Humphrey, Cattaraugus county	5	5	....	....	....	...	...	....	....	....	1
Hunter, Greene county	22	11.57	....	....	....	...	...	....	....	....	1
Huntington, Suffolk county	115	14.10	....	1	....	...	...	2	7	2	10

Hurley, Ulster county	25	9.90	....	....	....	...	...	....	....	....	4
Huron, Wayne county	11	5.41	1	....	....	...	...	....	....	....	1
Hyde Park, Dutchess county	36	12	....	1	....	...	...	....	....	....	3
Ilion, Herkimer county	36	8.57	....	...	....	...	...	1	....	....	8
Independence, Allegany county	5	4.16	....	....	....	...	...	....	....	...	1
Indian Lake, Hamilton county	7	11.38	...	....	....	...	...	....	1	1	1
Ira, Cayuga county	30	48.78	....	1	....	...	...	....	1	....	...
Irondequoit, Monroe county	7	3.50	....	....	....	...	...	....	....	....	1
Ischua, Cattaraugus county	8	8.51	....	...	....	...	1	1	....	....	1
Islip, Suffolk county	105	16.15	1	....	....	...	...	2	8	....	8
Italy, Yates county	5	3.33	....	....	....	...	...	....	....	....	...
ITHACA, Tompkins county	135	13.50	1	2	....	...	4	15	7	1	10
Jackson, Washington county	43	27.56	....	....	....	...	...	....	1	....	3
Jamaica,* Queens county	236	23.60	1	3	....	...	1	4	35	1	23
JAMESTOWN, Chautauqua county	165	11.78	2	10	....	...	...	2	3	3	15
Jasper, Steuben county	13	7.22	....	1	....	...	...	....	....	1	...
Java, Wyoming county	7	3.58	1	....	....	...	...	....	....	....	1
Jay, Essex county	31	12.40	....	1	....	...	...	....	4	1	1
Jefferson, Schoharie county	18	11.00	....	....	....	...	...	....	....	....	1
Jerusalem, Yates county	24	9.14	....	....	....	...	1	....	....	....	...
Jewett, Greene county	8	2.27	....	....	....	...	...	....	....	....	...
Johnsburgh, Warren county	15	5.45	....	....	....	...	...	....	....	1	...
Johnstown, Fulton county	65	18.57	....	3	....	...	...	....	4	....	3
Johnstown, Fulton county	88	14.66	....	3	....	...	...	2	6	2	10
Junius, Seneca county	10	7.40	....	....	....	...	...	....	....	....	...
Keene, Essex county	6	6.66	....	....	....	...	...	....	....	2	...
Kendall, Orleans county	21	11.05	....	....	....	...	...	....	....	1	1
Kent, Putnam county	15	11.02	....	....	....	...	...	....	....	....	1
Kiantone, Chautauqua county	8	16.00	....	....	....	...	...	....	....	....	...
Kinderhook,* Columbia county	57	13.57	....	1	....	...	1	1	....	....	
Kingsbury, Washington county	81	17.63	....	1	....	...	...	....	4	....	7

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC.—(*Continued.*)

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
KINGSTON, Ulster county	462	22.00	8	3	17	...	3	71	33	19	47
Kingston, Ulster county	3	2.72	....	....	....	...	...	....	....	....	...
Kirkland, Oneida county	79	15.80	....	2	....	...	1	13	2	....	9
Kirkwood, Broome county	16	11.85	1	....	....	...	...	....	1	1	...
Knox, Albany county	10	5.88	....	..	....	...	...	1	....	....	...
Kortwright, Delaware county	18	10.40	....	....	....	...	...	3	1	....	1
La Fayette, Onondaga county	28	12.96	....	....	....	...	...	....	....	....	...
La Grange, Dutchess county	28	16.00	....	....	....	...	5	....	1	....	4
Lake Pleasant, Hamilton county	6	17.14	...	....	....	...	...	....	....	....	1
Lancaster,* Erie county	44	11.00	1	3	....	...	...	1	1	....	5
Lansing, Tompkins county	13	4.33	1	....	....	...	...	...	....	....	...
Lansingburgh,* Rensselaer county	217	21.70	1	6	....	...	2	15	11	1	25
Lapeer, Cortland county	6	8.00	...	....	....	...	1	....	....	....	...
Laurens,* Otsego county	22	12.02	....	....	....	...	...	....	....	....	1
Lawrence, St. Lawrence county	36	14.40	....	....	....	...	...	....	....	....	4
Lebanon, Madison county	18	11.25	....	....	....	...	...	....	..	....	1
Ledyard, Cayuga county	26	11.81	....	....	....	...	...	5	....	....	2
Lee, Oneida county	21	8.89	....	....	....	...	...	....	....	....	...
Leicester, Livingston county	15	8.82	....	....	....	...	...	....	....	....	...
Lenox, Madison county	101	10.10	....	1	....	...	...	....	8	2	12
Leon, Cattaraugus county	1	.83	....	....	....	...	...	....	....	....	...

Le Ray, Jefferson county	33	12.40	....	....	....	...	1	....	1	....	...
Le Roy,* Genesee county	59	13.13	....	3	....	...	...	5	....	2	6
Lewis, Essex county	11	6.19	....	....	....	...	...	....	....	....	1
Lewis, Lewis county	9	7.75	....	1	....	...	...	....	1	....	...
Lewisboro, Westchester county	19	11.87	1	....	....	...	2	....	....	1	...
Lewiston,* Niagara county	27	9.74	....	1	....	...	2	....	2	...	1
Lexington, Greene county	16	11.76	....	....	....	...	1	....	....	....	...
Leyden, Lewis county	8	4.21	....	....	....	...	...	....	....	....	...
Liberty,* Sullivan county	44	13.75	....	....	....	...	..	1	4	....	2
Lima,* Livingston county	29	10.35	....	....	....	...	...	....	....	....	2
Lincklaen, Chenango county	8	8.88	....	....	....	...	...	....	1	....	1
Lindley, Steuben county	1	.63	....	....	....	...	...	....	....	....	...
Lisbon, St. Lawrence county	14	3.25	....	....	....	...	...	....	....	....	1
Lisle,* Broome county	24	10.00	....	2	....	...	...	....	....	....	2
Litchfield, Herkimer county	4	3.33	....	....	1	...	...	....	....	...	...
Little Falls, Herkimer county	......	......	....	....	....	...	...	....	....	....	...
Little Falls, Herkimer county	135	15.88	....	6	1	...	...	13	2	2	14
Little Valley, Cattaraugus county	11	9.16	....	....	....	...	...	....	....	....	2
Livingston, Columbia county	24	11.65	....	....	....	...	...	....	1	....	...
Livonia,* Livingston county	......	......	....	....	....	...	...	....	....	....	...
Lloyd, Ulster county	45	16.66	....	....	....	...	...	2	....	3	5
Locke, Cayuga county	18	8.41	....	....	....	...	...	....	2	....	1
LOCKPORT, Niagara county	173	11.59	....	3	....	...	...	2	9	2	16
Lockport, Niagara county	16	5.51	1	1	....	...	...	....	1	....	...
Lodi, Seneca county	23	11.84	....	1	....	...	...	....	....	....	2
LONG ISLAND CITY, Queens county	767	36.52	....	4	5	...	30	84	68	16	61
Long Lake, Hamilton county	19	58.43	....	....	....	...	...	10	....	....	...
Lorraine, Jefferson county	19	13.24	....	....	....	...	...	....	....	....	..
Louisville, St. Lawrence county	7	3.46	....	....	....	...	...	....	....	....	2
Lowville,* Lewis county	54	16.87	....	....	....	...	...	....	2	....	6
Lumberland, Sullivan county	7	6.66	....	....	....	...	...	2	....	....	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Luzerne, Warren county	26	17.93	....	3	....	...	...	2	....	....	2
Lyme, Jefferson county	25	4.34	....	...	....	...	...	1	3	....	1
Lyndon, Cattaraugus county	4	4.81	....	....	....	...	...	1	....	....	...
Lyons,* Wayne county	116	19.33	1	2	3	5	1	6	6	2	5
Lyonsdale, Lewis county	1	.66	....	....	....	...	...	....	....	....	...
Lysander, Onondaga county	30	6.12	....	1	....	...	...	....	....	....	...
Macdonough, Chenango county	10	7.69	....	....	....	...	...	....	....	....	...
Macedon,* Wayne county	38	13.24	....	....	....	...	1	1	....	....	5
Machias, cattaraugus county	48	30.96	....	2	....	...	...	....	....	....	3
Macomb, St. Lawrence county	2	1.15	....	....	....	...	...	....	....	....	...
Madison,* Madison county	31	12.40	....	....	....	...	...	1	2	....	3
Madrid, St. Lawrence county	18	8.18	....	....	....	...	...	....	....	1	4
Maine, Broome county	17	7.98	....	....	....	...	...	....	....	....	...
Malone,* Franklin county	133	14.77	1	....	....	...	...	12	8	1	8
Malta, Saratoga county	12	9.71	....	....	....	...	...	....	....	....	...
Mamakating, Sullivan county	49	12.25	....	....	....	...	...	....	1	....	5
Mamaroneck, Westchester county	48	24.00	1	2	....	...	...	....	1	....	5
Manchester, Ontario county	73	18.25	....	1	....	...	...	1	3	....	6
Manheim, Herkimer county	1	.40	....	....	....	...	...	....	....	....	...
Manlius,* Onondaga county	77	12.63	....	....	....	...	...	....	....	....	8
Mansfield, Cattaraugus county	5	4.54	....	....	....	...	...	....	....	....	...

Marathon,* Cortland county	29	17.05	....	....	....	...	...	....	1	....	1
Marbletown, Ulster county	65	16.25	....	2	2	...	2	2	4	....	9
Marcellus, Onondaga county	32	11.85	1	....	....	...	...	....	1	....	3
Marcy, Oneida county	16	11.03	....	....	....	...	...	....	....	....	...
Marilla, Erie county	29	15.89	....	....	....	...	...	....	....	....	...
Marion, Wayne county	31	14.76	....	2	....	...	...	....	....	....	1
Marlborough, Ulster county	45	12.96	....	....	....	...	4	1	....	....	5
Marshall, Oneida county	24	10.54	....	....	....	...	...	....	....	....	4
Martinsburgh, Lewis county	28	11.66	....	....	....	...	...	....	....	....	2
Maryland, Otsego county	29	12.47	....	....	....	...	...	....	2	....	2
Masonville, Delaware county	10	5.88	....	....	....	...	...	....	....	....	...
Massena, St. Lawrence county	37	13.45	....	....	....	...	...	....	....	....	4
Mayfield, Fulton county	26	11.30	....	....	....	...	...	....	3	1	2
Medina, Orleans county	64	16.00	....	4	....	...	1	1	1	2	4
Mendon,* Monroe county	58	15.00	....	....	....	...	1	....	3	....	3
Mentz, Cayuga county	43	18.69	....	....	....	...	...	....	....	....	5
Meredith, Delaware county	18	10.77	....	....	....	...	...	....	1	....	...
Mexico,* Oswego county	70	18.91	....	1	....	...	...	....	3	....	1
Middlebury, Wyoming county	32	17.70	....	....	....	2	...	2	....	....	...
Middleburgh,* Schoharie county	46	13.52	....	....	....	...	...	....	....	....	2
Middlefield, Otsego county	38	13.94	....	1	....	...	...	....	....	....	2
Middlesex, Yates county	12	8.21	....	....	....	...	...	1	....	....	1
MIDDLETOWN, Orange county	230	23.00	....	1	1	...	25	20	19	....	24
Middletown, Delaware county	50	16.66	....	1	....	...	...	....	1	3	2
Milan, Dutchess county	16	12.30	....	....	....	...	...	....	....	....	...
Milford, Otsego county	44	18.97	....	....	....	...	...	1	1	....	1
Milo, Yates county	23	39.93	....	....	....	...	...	....	....	....	...
Milton, Saratoga county	87	34.11	1	2	...	...	2	2	....	....	8
Mina, Chautauqua county	7	6.36	....	....	....	...	...	....	....	....	...
Minden, Montgomery county	64	12.55	....	3	....	...	...	1	2	....	4
Minerva, Essex county	8	6.89	....	....	....	...	...	....	....	....	1

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC.—(*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Minisink, Orange county	30	22.06	....	....	....	...	2	1	1	....	1
Mohawk,* Montgomery county	62	21.66	....	....	....	...	...	....	2	....	4
Moira, Franklin county	43	19.11	1	....	....	...	...	1	1	....	4
Monroe, Orange county	47	9.21	....	2	....	...	...	....	3	....	4
Montague, Lewis county	9	9.00	....	1	....	...	...	....	....	....	...
Montezuma,* Cayuga county	17	13.07	....	....	....	...	...	....	....	....	2
Montgomery, Orange county	74	15.41	....	1	1	...	9	1	....	....	5
Montour, Schuyler county	27	15.25	....	....	....	...	...	....	....	....	...
Mooers, Clinton county	24	5.43	1	1	....	...	...	2	1	....	7
Moravia,* Cayuga county	9	3.33	....	....	....	...	...	....	....	....	...
Moreau, Saratoga county	36	14.11	....	....	....	...	...	....	3	1	3
Morehouse, Hamilton county	2	10.00	....	....	....	...	...	....	....	....	...
Moriah, Essex county	75	10.13	....	1	....	...	...	3	3	2	5
Morris,* Essex county	31	12.91	....	....	....	...	...	....	....	....	1
Morristown,* St. Lawrence county	37	16.81	....	2	....	...	...	....	2	....	6
Mount Hope, Orange county	18	11.64	....	....	....	...	...	....	....	....	1
Mount Morris,* Livingston county	38	12.96	....	....	....	...	...	....	....	....	1
Mount Pleasant, Westchester county	76	13.76	....	1	....	...	...	1	4	3	9
Mount Vernon, Westchester county	258	23.45	....	2	....	...	4	12	30	4	20
Murray, Orleans county	49	16.33	....	....	....	...	...	....	3	....	2
Nanticoke, Broome county	12	12.00	....	....	....	...	...	....	....	....	1

Naples, Ontario county	10	37.03	....	1	....	...	...	....	....	...	1
Napoli, Cattaraugus county	6	5.45	....	....	....	...	...	....	....	....	...
Nassau, Rensselaer county	33	12.54	....	....	....	...	...	....	....	1	..
Nelson, Madison county	23	13.93	....	....	....	...	...	.. .	....	2	2
Neversink, Sullivan county	11	5.11	....	1	...	...	...	....	....	....	...
New Albion, Cattaraugus county	22	12.57	....	1	....	...	...	....	....	....	1
Newark, Wayne county	53	15.14	....	1	....	...	...	....	2	1	6
Newark Valley, Tioga county	38	14.61	....	....	....	...	2	1	...	....	4
New Baltimore, Greene county	35	13.35	....	....	....	...	...	....	....	....	3
New Berlin,* Chenango county	......	......	....	....	....	...	...	....	....	....	...
New Breman, Lewis county	14	5.83	....	....	...	...	...	....	....	....	2
New Brighton, Richmond county	340	22.66	2	3	2	...	12	8	17	7	35
NEWBURGH, Orange county	467	23.35	1	5	4	...	1	32	22	7	70
Newburgh, Orange county	15	3.75	....	....	....	...	2	...	4	....	...
Newcastle, Westchester county	25	8.92	....	....	....	...	...	....	1	....	1
Newcomb, Essex county	9	25.71	....	....	....	...	...	1	1	....	...
Newfane, Niagara county	29	11.78	....	....	....	...	...	....	....	....	2
Newfield, Tompkins county	5	1.53	....	....	....	...	...	....	....	....	...
New Hartford,* Oswego county	48	10.90	....	....	....	...	1	....	7	....	2
New Haven, Oswego county	23	13.52	....	1	....	...	...	....	....	....	...
New Hudson, Allegany county	11	10.47	...	....	....	...	...	1	....	....	...
New Lebanon, Columbia county	26	11.55	....	....	....	...	...	....	3	...	3
New Lisbon, Otsego county	19	12.10	....	....	....	...	...	1	....	....	1
New Paltz, Ulster county	17	8.50	....	1	....	...	...	....	....	....	1
Newport,* Herkimer county	22	11.00	....	....	....	...	...	....	....	....	...
New Rochelle, Westchester county	6	1.13	....	....	....	...	...	....	....	...	2
New Rochelle, Westchester county	122	22.18	....	2	1	...	2	5	10	5	7
New Scotland, Albany county	30	9.23	....	1	....	...	1	...	....	....	1
Newstead, Erie county	39	10.83	....	1	....	...	...	....	1	....	3
Newtown, Queens county	358	35.80	....	2	3	...	5	39	33	3	28
New Utrecht, Kings county	159	33.47	....	3	1	...	4	7	3	5	11

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
New Windsor, Orange county	9	3.46	....	....	....	...	...	....	1	....	...
Niagara, Niagara county	140	18.82	....	5	....	...	...	2	9	4	13
Nichols, Tioga county	15	8.82	....	1	....	...	1	....	....	....	1
Niles, Cayuga county	13	6.84	....	1	....	...	...	....	....	....	...
Niskayuna, Schenectady county	6	6.00	....	....	....	...	...	....	....	....	1
Norfolk, St. Lawrence county	17	6.80	....	....	....	...	...	....	...	....	1
Northampton, Fulton county	16	7.61	....	1	....	...	...	....	1	....	1
North Castle, Westchester county	20	10.81	....	....	....	...	1	....	...	....	...
North Collins, Westchester county	8	4.27	....	....	....	...	...	....	1	....	...
North Dansville, Livingston county	73	17.38	....	....	1	...	...	2	1	....	7
North East, Dutchess county	26	11.81	....	2	....	...	...	....	....	....	4
North Elba, Essex county	15	30.00	....	....	....	...	...	...	....	3	...
Northfield, Richmond county	146	19.21	2	4	....	...	1	3	11	2	23
North Greenbush, Rensselaer county	62	14.76	....	2	1	...	2	2	3	1	3
North Hempstead, Queens county	136	17.00	....	....	....	...	6	13	2	2	18
North Hudson, Essex county	2	2.85	....	....	....	...	...	....	1	....	...
North Norwich, Chenango county	7	7.00	....	....	....	...	...	1	....	....	2
North Salem, Westchester county	21	12.35	....	1	....	...	...	...	1	....	4
Northumberland, Saratoga county	23	14.37	....	....	....	...	...	1	1	....	...
Norway, Herkimer county	7	7.00	....	....	....	...	...	....	....	....	1
Norwich, Chenango county	9	6.00	....	....	....	...	...	...	....	....	...

Norwich, Chenango county	112	20.34	2	5	2	...	1	5	13	4	10
Nunda, Livingston county	37	13.21	....	1	....	...	...	....	....	....	2
Nyack, Rockland county	51	10.20	1	1	....	...	...	....	5	1	6
Oakfield,* Genesee county	12	8.00	...	....	....	...	...	....	....	1	...
Ogden, Monroe county	53	17.66	....	....	....	...	...	....	1	....	4
OGDENSBURGH, St. Lawrence county	200	18.18	1	8	....	...	...	6	14	9	34
Ohio, Herkimer county	8	8.00	....	....	....	...	1	....	....	....	...
Olean, Cattaraugus county	10	9.09	....	....	....	...	...	....	....	....	1
Olean, Cattaraugus county	105	13.12	1	4	...	...	...	2	11	....	6
Olive, Ulster county	32	10.66	....	....	....	...	...	1	....	....	3
Oneonta,* Otsego county	119	17.00	....	4	....	...	...	14	9	....	7
Onondaga, Onondaga county	134	29.39	1	....	....	9	...	2	1	....	10
Ontario, Wayne county	31	10.33	....	....	....	...	...	....	1	....	2
Oppenheim, Fulton county	5	2.50	....	....	....	...	...	....	....	....	...
Orange, Schuyler county	22	11.00	....	....	....	...	...	1	....	....	1
Orangetown, Rockland county	57	18.38	...	....	1	...	1	....	....	3	5
Orangeville, Wyoming county	26	22.41	....	....	....	...	...	....	1	....	...
Orleans, Jefferson county	10	4.32	....	....	....	...	...	....	....	....	2
Orwell, Oswego county	16	10.32	....	....	...	...	...	2	....	....	...
Osceola, Lewis county	1	1.49	....	....	....	...	...	....	....	....	...
Ossian, Livingston county	2	1.66	....	....	....	...	...	....	....	....	...
Ossining, Westchester county	35	14.00	....	....	....	...	...	...	....	....	3
Oswegatchie, St. Lawrence county	26	8.66	....	1	....	...	...	....	....	....	5
OSWEGO, Oswego county	288	12.00	1	4	3	...	2	2	15	3	44
Oswego, Oswego county	51	17.00	....	1	....	...	...	1	....	....	...
Otego, Otsego county	37	18.94	....	1	....	...	...	....	....	....	3
Otsego, Otsego county	23	4.89	1	1	....	...	...	1	....	....	1
Otisco, Onondaga county	......	......	....	....	....	...	...	....	....	....	...
Otselic, Chenango county	5	3.33	....	....	....	...	1	....	....	....	...
Otto, Cattaraugus county	8	7.14	....	....	....	...	...	....	....	....	...
Ovid,* Seneca county	95	26.38	....	2	....	...	...	....	2	....	14

[illegible]
[illegible]
[illegible]
Oxford, Chenango county
Oyster Bay, Queens county
Palatine, Montgomery county
Palermo, Oswego county
Palmyra, Wayne county
Pamelia, Jefferson county
Paris, Oneida county
Parish, Oswego county
Parishville, St. Lawrence county
Parma, Monroe county
Patterson, Putnam county
Pavilion, Genesee county
Pawling, Dutchess county
Peekskill, Westchester county
Pelham, Westchester county
Pembroke, Genesee county
Pendleton, Niagara county
Penfield, Monroe county

Penn Yan, Yates county	71	15.77	1	2	....	...	...	....	3	3	10
Perrinton, Monroe county	73	18.25	....	1	....	...	...	....	2	....	7
Perry,* Wyoming county	43	16.53	....	....	....	...	...	....	1	1	1
Perrysburgh, Cattaraugus county	25	17.85	....	...	....	...	1	....	....	....	2
Persia, Cattaraugus county	21	15.32	....	2	....	...	1	....	....	1	2
Perth, Fulton county	7	7.77	....	1	....	...	...	....	....	....	...
Peru, Clinton county	21	8.07	....	....	....	...	...	1	....	....	2
Petersburgh, Rensselaer county	17	9.44	....	....	....	...	...	1	....	....	2
Pharsalia, Chenango county	......	......	....	....	....	...	...	....	....	....	...
Phelps,* Ontario county	67	9.44	....	4	1	...	...	....	1	....	8
Philadelphia,* Jefferson county	25	14.28	....	....	....	...	1	....	1	....	2
Phillipstown, Putnam county	26	5.90	....	....	....	...	...	1	....	....	6
Pierrepont, St. Lawrence county	14	5.60	....	1	....	...	...	....	....	....	1
Pike,* Wyoming county	18	10.00	....	....	....	...	...	....	...	....	1
Pine Plains, Dutchess county	15	11.11	....	....	....	...	1	....	....	....	3
Pinckney, Lewis county	4	3.47	....	....	....	...	...	....	....	....	1
Pitcairn, St. Lawrence county	8	10.00	....	....	....	...	...	1	....	....	1
Pitcher, Chenango county	8	7.27	2	1	....	...	...	....	....	....	...
Pittsfield, Otsego county	1	.71	....	....	....	...	...	....	....	....	...
Pittsford, Monroe county	31	13.77	....	....	....	..	...	....	2	...	...
Pittstown, Rensselaer county	50	12.19	...	....	....	...	1	1	....	....	2
Plainfield, Otsego county	21	17.50	....	....	....	...	...	...	....	....	1
Plattekill, Ulster county	14	6.33	....	1	1	...	...	....	....	....	1
Plattsburgh, Clinton county	28	8.75	....	....	....	...	...	3	2	1	3
Plattsburgh, Clinton county	109	15.57	....	1	2	...	...	5	6	4	16
Pleasant Valley,* Dutchess county	20	11.11	1	....	....	...	...	....	....	....	...
Plymouth, Chenango county	8	6.15	....	1	....	...	...	2	....	....	1
Poestenkill, Rensselaer county	29	17.05	....	....	....	...	...	2	1	1	4
Poland, Chautauqua county	12	7.74	....	....	....	...	...	....	....	....	...
Pomfret, Chautauqua county	26	13.00	....	....	....	...	...	....	....	....	1
Pompey, Onondaga county	35	10.61	....	....	....	...	...	....	....	....	1

REPORT OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC.—(Continued.)

NAME OF PLACE.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Portage, Livingston county	4	3 56							1		
Portchester, Westchester county	57	10 25			1		[illegible]	[illegible]	1	[illegible]	4
Porter, Niagara county	23	11 50									
Port Jervis, Orange county	137	11 13		7			1	[illegible]	[illegible]	1	[illegible]
Portland, Chautauqua county	......	......									
Portville, Cattaraugus county	3	1 26									
Potsdam, St. Lawrence county	61	17 77	1						[illegible]		[illegible]
Potsdam, St. Lawrence	68	17 00	...	1				[illegible]	[illegible]	1	[illegible]
Potter, Yates county	21	10 50		1					1		[illegible]
POUGHKEEPSIE, Dutchess county	116	20 54	1	[illegible]	1		4	[illegible]	18	[illegible]	[illegible]
Poughkeepsie, Dutchess county	82	17 15	...					4	1		7
Poundridge, Westchester county	16	16 00									1
Prattsburgh,[1] Steuben county	19	8 08		1					[illegible]		1
Prattsville, Greene county	9	8 03	...								
Preble, Cortland county	13	11 40	...								1
Preston, Chautauqua county	7	7 77	...								1
Princetown, Schenectady county	5	5 88	...								
Providence, Saratoga county	18	18 00	....	1					1		8
Pulteney, Steuben county	16	9 03	....	1							
Putnam, Washington county	......	......	...								
Putnam Valley, Putnam county	.....	......	....								

Queensbury, Warren county........	26	17.33	....	....	....	...	...	....	....	....	1
Ramapo, Rockland county..........	103	20.60	1	....	....	...	...	5	5	5	11
Randolph,* Cattaraugus county.....	25	10.00	....	....	....	...	...	....	3	....	3
Rathbone, Steuben county..........	2	1.45	....	....	....	...	...	....	....	....	...
Reading, Schuyler county	19	12.66	....	....	2	...	...	....	....	....	1
Redfield, Oswego county...........	3	2.30	....	....	....	...	...	....	....	....	1
Redhook, Dutchess county..........	58	12.88	....	....	....	...	1	2	....	....	11
Red House, Cattaraugus county.....	1	2.00	....	....	....	...	...	....	....	....	...
Remsen,* Oneida county	23	19.16	....	....	....	...	...	....	....	....	2
Rensselaerville, Albany county......	16	6.40	....	....	....	...	...	....	....	....	1
Rhinebeck,* Dutchess county	43	11.02	....	....	....	...	...	4	3	1	...
Richfield, Otsego county............	23	9.20	....	....	....	...	...	....	....	....	...
Richford, Tioga county.............	10	5.55	....	....	....	...	...	....	....	....	1
Richland, Oswego county...........	65	16.25	....	1	....	...	...	2	3	2	5
Richmond, Ontario county..........	14	7.77	....	....	....	...	...	....	....	....	...
Richmondville, Schoharie county....	24	11.42	....	....	....	...	....	....	1	....	...
Ridgeway, Orleans county..........	31	5.63	....	1	....	...	...	1	....	....	3
Riga, Monroe county	21	9.54	....	1	....	...	...	....	....	....	3
Ripley, Chautauqua county.........	11	5.50	....	....	....	...	...	....	....	....	...
Riverhead, Suffolk county..........	50	12.50	....	2	....	...	...	3	2	....	4
ROCHESTER, Monroe county..........	2,130	18.84	1	39	5	...	1	82	211	59	254
Rochester, Ulster county..........	31	7.56	....	....	1	...	...	2	...	....	2
Rockland, Sullivan county..........	39	15.60	....	2	....	...	2	1	4	....	3
Rodman, Jefferson county	21	14.00	....	....	....	...	...	....	....	....	...
ROME, Oneida county...............	284	23.66	3	3	1	1	1	29	15	6	38
Romulus, Seneca county............	56	20.00	....	1	....	...	...	....	....	....	3
Root, Montgomery county...	3	13.04	...	....	....	...	...	....	....	....	...
Rose, Wayne county	24	10.66	....	....	....	...	...	....	1	....	...
Roseboom, Otsego county	11	7.33	....	....	....	...	...	...	....	....	...
Rosendale, Ulster county...........	106	22.08	....	1	6	...	...	8	13	3	12
Rossie, St. Lawrence county	2	1.17	....	....	....	...	...	....	....	....	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Rotterdam, Schenectady county	31	12.91	....	2	....	...	...	1	....	....	2
Roxbury, Delaware county	21	6.26	....	....	....	...	...	....	....	1	4
Royalton, Niagara county	19	3.87	....	....	....	...	...	1	....	....	1
Rush, Monroe county	23	13.14	....	....	....	...	...	....	2	....	...
Rushford, Allegany county	12	8.00	....	....	....	...	...	....	...	....	...
Russell, St. Lawrence county	13	5.41	....	....	1	...	...	....	1	....	1
Russia, Herkimer county	......	......	....	....	....	...	...	....	....	....	...
Rutland, Jefferson county	26	14.44	....	2	....	...	...	....	....	....	...
Rye, Westchester county	52	7.87	....	....	....	...	...	....	5	....	2
Sag Harbor, Suffolk county	71	23.66	3	3	....	...	...	....	4	2	9
St. Armand, Essex county	7	14.00	....	....	....	...	...	....	....	....	...
St. Johnsville,* Montgomery county	24	12.00	....	1	....	...	...	....	....	1	3
Salamanca, Cattaraugus county	11	11.00	...	....	....	....	...	....	...	....	...
Salamanca, Cattaraugus county	63	10.50	....	2	....	...	...	....	6	1	5
Salem,* Washington county	46	13.14	....	1	....	...	...	....	....	....	7
Salina, Onondaga county	47	16.20	....	3	....	...	...	....	3	1	7
Salisbury, Herkimer county	5	2.63	....	....	....	...	...	....	....	....	...
Sand Lake, Rensselaer county	57	22.35	....	....	....	...	5	1	2	....	6
Sandy Creek,* Oswego county	34	11.72	....	...	....	...	...	....	....	....	...
Sanford, Broome county	26	7.14	....	....	....	...	...	1	....	1	2
Sangerfield, Oneida county	46	14.37	....	....	....	...	1	1	1	....	2

Saranac, Clinton county	48	10.54	2	....	....	...	1	....	3	....	15
Saratoga, Saratoga county	55	12.08	....	....	....	...	...	5	3	...	7
Saratoga Springs, Saratoga county	253	25.30	....	5	3	...	2	13	22	3	38
Saratoga Springs, Saratoga county	46	9.20	....	....	....	...	...	2	3	....	2
Sardinia, Erie county	16	9.03	....	....	....	...	...	....	....	....	...
Saugerties, Ulster county	114	45.60	....	1	....	...	...	9	7	....	16
Saugerties, Ulster county	77	19.25	....	1	1	...	1	5	6	3	10
Savannah,* Wayne county	29	15.26	....	...	....	...	...	....	...	....	3
Scarsdale, Westchester county	3	4.61	....	....	....	...	...	....	....	....	...
Schaghticoke,* Rensselaer county	43	11.94	....	....	....	...	1	1	2	....	10
SCHENECTADY, Schenectady county	367	18.35	2	6	2	...	2	28	26	5	48
Schodack, Rensselaer county	82	19.06	....	4	....	...	...	5	2	1	6
Schoharie,* Schoharie county	80	23.88	....	2	....	...	...	4	2	....	10
Schroeppel, Oswego county	44	12.94	....	1	....	...	...	....	....	....	5
Schroon, Essex county	13	7.52	....	....	....	...	...	....	....	....	1
Schuyler, Herkimer county	......	......	....	....	....	...	...	....	....	....	...
Schuyler Falls, Clinton county	21	12.72	....	2	....	...	...	....	....	....	...
Scio, Allegany county	11	7.09	....	1	....	...	...	....	....	1	2
Scipio, Cayuga county	28	13.33	....	....	....	...	...	....	....	....	1
Scott, Cortland county	14	14	....	....	....	...	...	....	1	....	1
Scriba, Oswego county	38	12.66	....	1	....	...	...	....	2	....	2
Sempronius, Cayuga county	6	5	1	....	...	...	...	...	1	....	...
Seneca, Ontario county	33	11.37	....	....	....	...	...	2	....	...	3
Seneca Falls,* Seneca county	113	16.14	...	1	3	...	10	1	....	....	10
Sennett, Cayuga county	38	23.03	....	....	....	...	...	....	....	....	2
Seward, Schoharie county	24	13.71	....	1	....	...	...	....	....	....	...
Shandaken, Ulster county	47	16.70	....	....	....	...	...	....	....	1	2
Sharon, Schoharie county	33	12.69	....	....	....	...	...	....	2	....	2
Shawangunk, Ulster county	26	8.66	....	....	....	...	2	....	....	....	1
Shelby, Orleans county	27	9.64	....	....	....	...	...	....	1	....	3
Sheldon, Wyoming county	26	11.55	....	....	....	...	...	....	....	....	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Shelter Island, Suffolk county	9	12.00	....	...	....	...	...	...	....	....	...
Sherburne,* Chenango county	28	8.88	....	1	....	...	...	....	...	....	3
Sheridan, Chautauqua county	16	10.00	....	....	....	...	...	....	....	....	...
Sherman, Chautauqua county	24	15.00	...	....	....	...	...	....	....	....	...
Sidney, Delaware county	40	16.26	....	1	....	...	...	...	1	....	2
Sing Sing, Westchester county	125	19.23	1	1	1	...	...	4	4	2	25
Skaneateles,* Onondaga county	44	8.80	....	1	....	...	...	1	1	....	3
Smithfield, Madison county	11	8.80	....	....	....	...	1	....	....	....	...
Smithtown, Suffolk county	48	21.33	....	....	....	...	...	....	4	....	3
Smithville, Chenango county	21	14.00	....	....	....	...	...	....	1	....	2
Smyrna,* Chenango county	17	10.30	...	1	....	...	...	....	1	....	...
Sodus, Wayne county	82	15.47	....	1	1	...	...	2	3	....	8
Solon, Cortland county	2	2.35	....	....	....	...	...	....	....	....	...
Somers, Westchester county	13	7.97	....	....	....	...	...	1	....	....	2
Somerset, Niagara county	11	5.50	....	....	....	...	...	....	....	....	...
Southampton, Suffolk county	89	25.42	....	2	....	...	...	....	6	....	7
South Bristol, Ontario county	2	1.48	....	....	....	...	...	....	1	....	...
South East, Putnam county	66	18.85	....	1	2	...	...	1	1	....	2
Southfield, Richmond county	34	6.80	....	....	....	...	...	....	2	....	3
Southold, Suffolk county	79	10.87	....	1	6	...	...	3	3	....	4
Southport, Chemung county	81	22.50	....	....	....	...	1	18	2	....	4

South Valley, Cattaraugus county	1	1.00	....	....	....	...	...	....	....	....	...
Spafford, Onondaga county	4	2.66	....	....	....	...	...	....	....	....	...
Sparta, Livingston county	7	5.83	....	....	....	...	...	....	....	....	1
Spencer, Tioga county	9	3.67	....	....	....	...	...	....	....	....	1
Springfield, Otsego county	22	11.00	....	1	....	...	...	....	2	....	1
Springport, Cayuga county	22	10.47	....	....	....	...	...	....	....	....	1
Springwater, Livingston county	18	7.82	....	....	....	...	...	1	....	....	1
Stafford, Genesee county	12	6.66	....	1	....	...	...	....	....	....	1
Stamford,* Delaware county	22	13.33	1	1	....	...	...	....	....	....	3
Stanford, Dutchess county	27	12.85	....	1	....	...	...	....	....	....	3
45 Stark, Herkimer county	11	5.33	....	....	....	...	...	2	....	....	...
Starkey, Yates county	6	2.22	....	2	....	...	...	....	....	....	...
Stephentown, Rensselaer county	22	11.00	....	....	....	...	...	5	....	....	2
Sterling, Cayuga county	40	13.33	....	....	....	...	...	....	1	....	1
Steuben, Oneida county	2	1.60	....	....	....	...	...	....	....	....	...
Stillwater,* Saratoga county	80	23.52	....	....	....	...	...	....	4	....	9
Stockbridge, Madison county	20	10.00	....	....	....	...	...	....	....	....	1
Stockholm, St. Lawrence county	32	9.27	....	....	....	...	...	....	....	....	4
Stockport, Columbia county	27	13.50	....	....	....	...	...	....	....	....	5
Stockton, Chautauqua county	22	12.22	....	....	....	...	...	1	1	....	2
Stony Creek, Warren county	.....	.....	....	....	....	...	...	....	....	....	...
Stony Point, Rockland county	44	13.33	1	....	....	...	6	2	3	....	3
Stratford, Fulton county	3	2.72	....	....	....	...	...	....	....	....	...
Stuyvesant, Columbia county	24	11.42	....	1	....	...	...	....	....	....	7
Sullivan, Madison county	49	10.20	....	....	....	...	...	....	3	....	6
Summer Hill, Cayuga county	8	7.76	....	2	....	...	...	....	....	....	...
Summit, Schoharie county	21	15.00	....	3	....	...	...	....	....	....	1
Sweden, Monroe county	23	15.33	....	1	....	...	...	1	....	....	2
SYRACUSE, Onondaga county	1,446	18.07	....	22	21	5	33	59	184	15	187
Taghkanick, Columbia county	......	......	....	....	....	...	...	....	....	....	...
Taylor, Cortland county	6	6.00	....	....	....	...	...	....	....	....	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC. — (*Continued*).

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Theresa,* Jefferson county	31	12.91	1	....	....	...	..	1	2	...	4
Thompson, Sullivan county	......	......	....	...	....	...	...	....	....	...	..
Throop, Cayuga county	8	6.66	....	....	....	...	...	...	..	....	1
Thurman, Warren county	3	2.55		....	....	...	...	....	....	...	1
Thurston, Steuben county	1	.73	....	....	....	...	..	...	....	...	...
Ticonderoga, Essex county	......	......	....	....	....	...	..	...	..	...	..
Tioga, Tioga county	8	2.50	...	....	....	..	..	....	..	....	.
Tompkins, Delaware county	25	9.80	....	....	....	...	...	....	....	...	.
Tonawanda,* Erie county	103	20.60	3	13	....	..	1	...	7	1	7
Torrey, Yates county	8	6.40	....	....	....	...	...	...	...	.	.
Trenton,* Oneida county	36	11.61	....	....	....	...	...	....	...	....	5
Triangle, Broome county	27	12.85	....	1	....	...	...	....	1	...	8
Troupsburgh, Steuben county	30	12.00	2	....	...	...	...	....	1	....	8
TROY, Rensselaer county	1,609	24.61	11	46	1	...	85	80	204	81	171
Truxton, Cortland county	9	5.80	....	....	....	...	1	....	....	....	...
Tully,* Onondaga county	24	16.00	....	....	....	...	...	....	1	....	1
Turin, Lewis county	23	17.69	....	....	....	...	...	8	...	....	...
Tuscarora, Steuben county	......	......	....	....	...	...	...	....	....	....	...
Tusten, Sullivan county	1	.50	....	....	....	...	...	....	....	....	...
Tyre, Seneca county	15	13.04	....	...	...	...	1	....	....	...	1
Tyrone, Schuyler county	......	......	....	....	....	...	...	..	....	...	.

Ulster, Ulster county	......	......	....	....	....	...	...	....	....	....	...
Ulysses, Tompkins county	......	......	....	....	....	...	...	....	....	....	...
Unadilla,* Otsego county	31	12.40	....	1	....	...	...	1	....	....	2
Union,* Broome county	35	13.42	....	....	....	...	...	1	....	....	5
Union Vale, Dutchess county	13	9.28	....	....	....	...	...	....	....	....	1
Urbana, Steuben county	29	11.37	....	....	....	...	...	....	3	....	3
UTICA, Oneida county	854	17.08	4	12	3	...	13	47	....	....	...
Van Buren, Onondaga county	17	5.48	....	....	....	...	...	....	1	....	1
Van Etten, Chemung county	6	3.00	....	2	....	...	...	....	....	....	1
Varick, Seneca county	14	8.00	....	....	....	...	...	1	....	....	2
Venice, Cayuga county	15	7.89	....	....	....	...	...	1	1	....	2
Vernon,* Oneida county	30	9.67	1	1	....	...	...	1	....	....	1
Verona, Oneida county	51	9.62	....	2	....	...	...	1	....	....	1
Vestel, Broome county	24	10.90	....	....	....	...	...	1	1	....	4
Veteran, Chemung county	17	7.36	....	1	....	...	...	....	....	....	...
Victor,* Ontario county	29	10.00	1	1	....	...	...	1	1	1	2
Victory, Cayuga county	13	6.50	...	....	....	...	...	...	....	....	...
Vienna, Oneida county	24	8.27	....	1	....	...	...	....	1	....	4
Villenova, Chautauqua county	9	6.00	....	....	....	...	...	....	....	....	...
Virgil, Cortland county	20	10.52	....	....	....	...	1	....	....	...	1
Volney, Oswego county	9	3.00	....	....	....	...	...	....	....	....	1
Waddington,* St. Lawrence county	2	.75	....	....	....	...	...	....	....	....	...
Wales, Erie county	42	30.00	1	....	....	...	...	....	....	1	2
Wallkill, Orange county	59	19.66	....	....	....	...	4	....	1	....	5
Walton,* Delaware county	45	12.71	2	2	....	...	...	....	2	1	8
Walworth, Wayne county	28	11.91	....	....	....	...	1	...	....	...	...
Wappinger, Dutchess county	24	4.80	....	....	1	...	...	....	....	....	...
Wappinger Falls, Dutchess county	74	14.80	....	....	1	...	6	....	2	3	13
Ward, Allegany county	......	......	....	....	....	...	...	....	....	....	...
Warren, Herkimer county	7	4.89	1	....	....	..	...	....	....	....	...
Warrensburgh, Warren county	28	16.00	....	1	....	...	...	....	3	....	2

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC.—(Continued.)

NAME OF PLACE.	Total number of deaths during the year.	Annual death rate per 1,000 population.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria and croup.	Diarrhœal diseases.	Other zymotic diseases.	Consumption.
Warsaw,* Wyoming county	......	......	....	....	....	...	...	....	....	....	...
Warwick,* Orange county	98	17.18	1	1	1	...	3	3	....	1	12
Washington, Dutchess county	43	15.35	....	....	....	...	...	....	1	....	2
Waterford,* Saratoga county	112	20.74	2	....	1	...	...	1	8	3	21
Waterloo, Seneca county	16	10.66	....	1	....	...	...	....	....	....	...
Waterloo, Seneca county	67	14.88	...	3	....	...	1	....	3	....	2
WATERTOWN, Jefferson county	224	18.36	....	4	....	...	...	13	18	10	27
Watertown, Jefferson county	10	7.69	....	....	....	...	...	....	....	....	...
Watervliet, Albany county	111	13.88	....	2	...	...	3	4	2	....	9
Watson, Lewis county	2	1.33	....	....	....	...	...	....	....	....	...
Waverly, Franklin county	34	6.80	....	....	....	...	2	1	1	1	3
Wawarsing, Ulster county	49	8.16	....	....	....	...	...	4	....	1	5
Wawayanda, Orange county	21	10.50	....	...	....	...	1	1	1	....	2
Wayland,* Steuben county	4	1.53	....	....	....	...	...	....	....	....	...
Wayne, Steuben county	......	......	....	....	....	...	...	....	....	....	...
Webster, Monroe county	30	10.00	....	....	....	...	...	1	1	....	2
Wells, Hamilton county	13	11.60	....	1	....	...	...	...	....	...	...
Wellsville,* Allegany county	......	......	....	....	....	...	...	....	....	....	...
West Almond, Allegany county	7	8.75	....	...	....	...	...	....	..	....	...
West Bloomfield, Ontario county	19	11.17	....	....	....	...	...	....	2	....	5
Westchester, Westchester county	184	19.14	1	....	1	...	1	3	4	4	10

Westerlo, Albany county	20	8.51	....	....	....	...	...	....	1	....	1
Western, Oneida county	10	3.44	....	1	....	...	...	....	....	....	1
Westfield,* Chautauqua county	40	13.33	....	2	...	...	...	....	1	1	3
Westfield, Richmond county	122	17.42	1	1	1	...	...	7	14	4	18
Westford, Otsego county	11	8.46	....	....	....	...	...	....	....	....	...
West Monroe, Oswego county	4	3.07	....	....	....	...	...	....	....	....	...
Westmoreland, Oneida county	28	10.18	....	....	....	...	...	....	....	....	5
Westport, Essex county	17	9.71	....	....	....	...	...	....	3	1	2
West Seneca, Erie county	25	7.14	....	....	....	...	...	1	....	....	1
West Sparta, Livingston county	3	2.50	....	....	....	...	...	....	....	....	...
West Troy, Albany county	270	20.76	....	7	....	...	3	23	20	4	32
West Turin, Lewis county	25	12.50	....	....	....	...	...	....	....	....	1
West Union, Steuben county	15	11.81	....	....	....	...	...	....	....	1	1
Westville, Franklin county	6	3.63	....	....	....	...	...	....	....	....	2
Wethersfield, Wyoming county	8	6.06	....	1	....	...	...	....	4	....	...
Wheatfield, Niagara county	101	22.95	....	6	....	...	1	2	1	4	7
Wheatland, Monroe county	40	15.38	....	....	....	...	1	2	....	....	1
Wheeler, Steuben county	4	2.75	....	....	....	...	...	....	....	....	...
White Creek, Washington county ...	12	4.36	....	....	....	...	...	....	....	....	2
Whitehall,* Washington county	94	17.40	....	....	1	...	...	....	1	2	3
White Plains,* Westchester county ..	80	19.51	....	1	....	1	1	3	1	....	8
Whitestown,* Oneida county	64	12.80	....	5	....	...	...	....	5	5	8
Willett, Cortland county	......	......	....	....	....	...	...	....	....	....	...
Williamson, Wayne county	25	9.09	....	....	....	...	...	....	1	....	...
Williamstown, Oswego county	16	8.88	....	....	....	...	...	....	....	....	...
Willing, Allegany county	......	......	....	....	....	...	...	....	....	....	...
Willsborough, Essex county	24	16.55	....	....	....	...	...	....	....	....	2
Wilmington, Essex county	3	3.00	....	....	...	...	...	....	....	....	...
Wilmurt, Herkimer county	1	3.33	....	....	....	...	...	....	....	....	...
Wilna, Jefferson county	7	1.59	....	....	....	...	...	1	....	....	...
Wilson,* Niagara county	15	4.61	....	....	....	...	...	....	....	....	...

RECORD OF EACH REPORTING LOCAL BOARD OF HEALTH, ETC.—(*Concluded*).

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Wilton, Saratoga county	16	14.54	....	....	....	...	...	....	....	....	...
Windham, Greene county	27	18.49	....	1	....	...	...	....	1	....	3
Windsor, Broome county	41	12.41	....	2	....	...	...	2	....	....	3
Winfield, Herkimer county	15	9.37	....	....	....	...	...	....	2	....	1
Wirt, Allegany county	2	1.63	....	....	....	...	...	....	....	....	...
Wolcott,* Wayne county	60	16.00	....	....	2	...	...	....	2	....	7
Woodhull, Steuben county	9	4.50	....	....	....	...	...	....	....	....	...
Woodstock, Ulster county	29	14.50	....	....	....	...	...	...	1	....	1
Worcester, Otsego county	35	17.50	....	2	1	...	1	1	1	....	5
Worth, Jefferson county	12	12.00	....	....	....	...	...	....	....	....	1
Wright, Schoharie county	19	11.87	....	....	....	...	...	...	1	....	1
Yates, Orleans county	24	12.00	....	2	....	...	...	....	1	2	2
YONKERS, Westchester county	543	18.10	1	6	2	...	23	10	85	1	62
York, Livingston county	......	......	....	....	....	...	...	....	....	....	...
Yorkshire, Cattaraugus county	24	13.33	....	...	....	...	...	....	....	1	1
Yorktown, Westchester county	33	13.20	...	....	....	...	...	....	....	1	...

MORTALITY IN THE SANITARY DISTRICTS.

The State is divided into eight sanitary districts. Most of these have their peculiar sanitary conditions, such as relate to character and closeness of population, proximity to the sea, topography, degree of soil drainage and so forth.

The sanitary districts are as follows:

Maritime (population in 1880, 2,098,589; present estimated city population, 2,334,836): Includes New York, Long Island, Staten Island and Westchester county. Hudson Valley (population in 1880, 750,143; present estimated city population, 269,100): All the counties on either side of the Hudson river, except Westchester, to and including Albany and Rensselaer. Adirondack and Northern (population in 1880, 330,454; present estimated city population, 22,200): The northern section of the State, the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. Mohawk Valley (population in 1880, 280,809; present estimated city population, 95,000): Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties. Southern Tier (population in 1880, 365,746; present estimated city population, 70,000): The seven counties along the southern border of the State. East Central (population in 1880, 354,320; present estimated city population, 80,000): Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. West Central (population in 1880, 321,247; present estimated city population, 36,000): Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. Lake Ontario and Western (population in 1880, 578,705; present estimated city population, 364,000): Oswego, Wayne, Monroe, Orleans, Niagara, and Erie counties. No census of the State has been taken since 1880; the population may be estimated at about 5,750,000. The following tables will show the mortality of each sanitary district taken from the *Monthly Bulletin* month by month for the year:

MARITIME DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	5,393	19	36	38	....	280	466	78	265	671
February	5,180	11	22	21	....	258	431	60	244	630
March	6,050	15	28	24	...	309	461	86	286	738
April	5,690	26	25	46	....	305	472	91	252	689
May	5,209	16	24	20	...	211	397	96	179	682
June	5,674	14	28	42	....	108	313	1,008	148	593
July	7,125	20	53	40	....	45	225	2,204	118	656
August	5,516	12	105	60	....	24	204	1,037	110	668
September	4,862	4	97	54	....	21	203	556	69	640
October	4,625	6	103	55	....	26	306	220	61	650
November	4,310	9	71	41	...	30	289	76	78	622
December	5,404	9	46	27	....	44	331	84	92	780
Total	65,038	161	638	468	....	1,661	4,098	5,596	1,892	8,019

HUDSON VALLEY DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	864	3	18	4	....	37	50	4	13	132
February	836	6	15	2	....	43	49	5	25	89
March	988	10	8	10	....	45	53	6	17	137
April	1,030	3	21	5	....	38	35	7	29	130
May	920	7	18	6	....	48	39	7	50	121
June	818	...	7	8	....	29	55	49	21	87
July	1,175	9	23	8	....	15	41	312	10	106
August	977	4	33	11	....	12	69	177	11	108
September	839	4	39	15	....	15	48	88	8	104
October	983	3	37	10	....	17	112	13	8	130
November	775	3	20	8	...	11	91	8	4	91
December	900	6	18	9	....	14	80	5	10	119
Total	11,105	58	257	96	....	324	722	681	206	1,354

ADIRONDACK AND NORTHERN DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	290	....	5	1	....	1	11	4	4	39
February	250	2	2	....	....	3	9	1	6	25
March	276	1	5	2	....	......	7	2	4	36
April	274	1	4	3	....	......	4	3	6	37
May	266	4	2	....	....	......	4	1	5	44
June	214	....	1	....	....	1	6	9	8	33
July	231	....	5	....	....	......	4	38	4	29
August	284	2	9	7	....	......	7	69	1	29
September	268	1	9	2	....	1	13	50	6	18
October	288	....	15	....	....	1	16	11	4	36
November	227	1	6	....	....	1	7	2	3	25
December	261	1	9	....	....	1	18	4	9	30
Total	3,129	13	72	15	....	9	106	194	60	381

MOHAWK VALLEY DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	360	1	9	....	1	2	23	3	4	46
February	332	3	6	....	....	1	13	2	1	40
March	405	3	5	....	....	7	12	4	1	52
April	402	1	8	1	....	1	13	3	9	49
May	269	3	3	1	....	2	14	5	13	48
June	309	6	1	2	....	2	7	11	6	39
July	437	4	9	1	....	2	5	96	6	54
August	467	4	13	1	....	2	13	104	11	51
September	435	1	16	6	....	4	29	53	3	33
October	406	1	12	3	....	2	42	18	4	39
November	386	....	8	....	....	......	40	2	2	34
December	335	5	9	2	....	5	31	4	4	42
Total	5,543	32	99	17	1	30	342	215	64	527

SOUTHERN TIER DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	250	4	3	....	....	3	2	1	3	16
February	235	3	5	....	1	3	4	1	3	13
March	327	....	4	....	....	4	4	4	4	37
April	298	3	8	1	....	2	8	5	7	38
May	266	1	2	....	....	2	2	4	4	37
June	204	1	2	1	....	4	2	6	3	23
July	271	....	8	....	....	......	3	45	3	18
August	344	1	20	1	....	5	2	62	4	29
September	317	1	23	5	....	5	8	55	1	24
October	324	3	21	5	....	2	23	7	3	26
November	251	1	13	2	....	2	24	3	2	23
December	203	2	6	3	....	2	35	3	4	16
Total	3,290	20	115	18	1	34	157	196	41	300

EAST CENTRAL DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	329	....	5	....	8	6	12	5	3	37
February	350	3	8	....	7	1	18	2	7	41
March	392	4	3	1	...	10	5	3	10	53
April	353	1	1	3	....	9	6	5	5	31
May	336	4	5	3	....	4	7	1	5	46
June	294	1	2	1	....	6	9	6	5	37
July	420	2	2	5	....	4	8	118	4	32
August	393	2	17	7	...	7	6	104	5	42
September	385	4	23	3	....	3	13	80	3	35
October	387	2	17	5	....	2	13	15	1	44
November	331	...	13	5	....	4	11	3	1	42
December	320	2	6	3	....	2	19	4	2	36
Total	4,290	25	102	36	15	58	127	346	51	476

MARITIME DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	5,393	19	36	38	....	280	466	78	265	671
February	5,180	11	22	21	....	258	431	60	244	630
March	6,050	15	28	24	....	309	461	86	286	738
April	5,690	26	25	46	....	305	472	91	252	689
May	5,209	16	24	20	....	211	397	96	179	682
June	5,674	14	28	42	....	108	313	1,008	148	593
July	7,125	20	53	40	....	45	225	2,204	118	656
August	5,516	12	105	60	....	24	204	1,037	110	668
September	4,862	4	97	54	....	21	203	556	69	640
October	4,625	6	103	55	....	26	306	220	61	650
November	4,310	9	71	41	....	30	289	76	78	622
December	5,404	9	46	27	....	44	331	84	92	780
Total	65,038	161	638	468	....	1,661	4,098	5,596	1,892	8,019

HUDSON VALLEY DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	864	3	18	4	....	37	50	4	13	132
February	836	6	15	2	....	43	49	5	25	89
March	988	10	8	10	....	45	53	6	17	137
April	1,030	3	21	5	....	38	35	7	29	130
May	920	7	18	6	....	48	39	7	50	121
June	818	....	7	8	....	29	55	49	21	87
July	1,175	9	23	8	....	15	41	312	10	106
August	977	4	33	11	....	12	69	177	11	108
September	839	4	39	15	....	15	48	88	8	104
October	983	3	37	10	....	17	112	13	8	130
November	775	3	20	8	....	11	91	8	4	91
December	900	6	18	9	....	14	80	5	10	119
Total	11,105	58	257	96	....	324	722	681	206	1,354

ADIRONDACK AND NORTHERN DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	290	....	5	1	....	1	11	4	4	39
February	250	2	2	....	....	3	9	1	6	25
March	276	1	5	2	....	......	7	2	4	36
April	274	1	4	3	....	......	4	3	6	37
May	266	4	2	....	....	......	4	1	5	44
June	214	....	1	....	....	1	6	9	8	33
July	231	....	5	....	....	......	4	38	4	29
August	284	2	9	7	....	......	7	69	1	29
September	268	1	9	2	....	1	13	50	6	18
October	288	....	15	....	....	1	16	11	4	36
November	227	1	6	....	....	1	7	2	3	25
December	261	1	9	....	....	1	18	4	9	30
Total	3,129	13	72	15	....	9	106	194	60	381

MOHAWK VALLEY DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	360	1	9	....	1	2	23	3	4	46
February	332	3	6	....	....	1	13	2	1	40
March	405	3	5	....	....	7	12	4	1	52
April	402	1	8	1	...	1	13	3	9	49
May	269	3	3	1	....	2	14	5	13	48
June	309	6	1	2	....	2	7	11	6	39
July	437	4	9	1	....	2	5	96	6	54
August	467	4	13	1	....	2	13	104	11	51
September	435	1	16	6	....	4	29	53	3	33
October	406	1	12	3	....	2	42	18	4	39
November	386	....	8	....	....	......	40	2	2	34
December	335	5	9	2	....	5	31	4	4	42
Total	5,543	32	99	17	1	30	342	215	64	527

SOUTHERN TIER DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	250	4	3	....	....	3	2	1	3	16
February	235	3	5	....	1	3	4	1	3	13
March	327	....	4	....	....	4	4	4	4	37
April	298	3	8	1	....	2	8	5	7	38
May	266	1	2	....	....	2	2	4	4	37
June	204	1	2	1	....	4	2	6	3	23
July	271	...	8	....	....	......	3	45	3	18
August	344	1	20	1	....	5	2	62	4	29
September	317	1	23	5	....	5	8	55	1	24
October	324	3	21	5	....	2	23	7	3	26
November	251	1	13	2	....	2	24	3	2	23
December	203	2	6	3	....	2	35	3	4	16
Total	3,290	20	115	18	1	34	117	196	41	300

EAST CENTRAL DISTRICT.

MONTHS.	All deaths.	Cerebro spinal fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Diphtheria.	Diarrhœa.	Other zymotic diseases.	Consumption.
January	329	....	5	....	8	6	12	5	3	37
February	350	3	8	....	7	1	18	2	7	41
March	392	4	3	1	...	10	5	3	10	53
April	353	1	1	3	....	9	6	5	5	31
May	336	4	5	3	....	4	7	1	5	46
June	294	1	2	1	....	6	9	6	5	37
July	420	2	2	5	....	4	8	118	4	32
August	393	2	17	7	...	7	6	104	5	42
September	385	4	23	3	....	3	13	80	3	35
October	387	2	17	5	....	2	13	15	1	44
November	331	...	13	5	....	4	11	3	1	42
December	320	2	6	3	....	2	19	4	2	36
Total	**4,290**	**25**	**102**	**36**	**15**	**58**	**127**	**346**	**51**	**476**

MONTHLY BULLETINS.

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

[Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT:										
Totals	....	5,392	......	2,262	41.9	19	....	36	38	....
NEW YORK CITY	*1,571,558	3,375	25.28	1,466	43.4	17	0	27	21	0
BROOKLYN	*814,500	1,535	22.93	647	42.2	0	0	5	14	0
Gravesend	*5,000	4	9.60	2	50.0	0	0	0	0	0
New Utrecht	*5,000	15	36.00	7	46.8	0	0	0	0	0
LONG ISLAND CITY	*21,000	49	28.00	8	15.7	0	0	1	0	0
Newtown	*10,000	32	38.40	17	53.1	0	0	0	0	0
Oyster Bay	*12,000	22	22.00	4	18.2	0	0	0	0	0
Hempstead	18,160	18	12.00	5	27.7	0	0	0	0	0
North Hempstead	8,000	12	18.00	3	25.0	0	0	0	1	0
Huntington	8,100	13	19.26	2	15.3	0	0	0	0	0
Southold	7,267	9	14.00	2	22.2	0	0	0	0	0
Sag Harbor	*3,000	6	24.00	1	16.7	0	0	0	0	0
Edgewater	12,000	9	......	0	....	0	0	0	0	0
Port Richmond	*3,600	6	20.00	2	33.3	0	0	0	0	0
Westfield	7,000	13	22.28	9	69.2	0	0	1	0	0
YONKERS	*30,000	37	14.80	12	33.0	0	0	1	0	0
Westchester	*7,000	13	22.28	3	23.1	0	0	0	0	0
Mount Vernon	*8,000	6	9.00	3	50.0	0	0	0	0	0
Portchester	*4,000	3	9.00	1	33.3	0	0	0	0	0
Sing Sing	*6,500	9	16.62	3	33.3	1	0	0	0	0
New Rochelle	*5,500	12	26.18	6	50.0	0	0	0	1	0
Peekskill	7,000	11	18.85	1	9.1	0	0	0	0	0
Rest of district	....	183	......	58	31.6	1	0	1	1	0
HUDSON VALLEY DIST.:										
Totals	....	864	......	224	26.0	3	....	18	4	....
ALBANY	*103,000	180	20.97	50	27.7	0	0	6	0	0
COHOES	*20,000	20	12.00	4	20.0	0	0	1	0	0
TROY	*65,000	126	23.26	47	37.3	1	0	1	0	0
West Troy	*13,000	26	24.00	7	26.9	0	0	1	0	0
Hoosick Falls	*6,000	13	26.00	2	15.3	0	0	0	0	0
Lansingburgh	*10,000	17	20.40	3	17.8	0	0	0	0	0
Green Island	*5,000	3	7.20	1	33.3	0	0	0	0	0
Greenbush	*8,000	15	22.75	6	40.0	0	0	1	0	0
Coxsackie	4,000	6	18.00	2	33.3	0	0	0	0	0
Catskill	*4,500	4	10.67	0	....	0	0	0	0	0
HUDSON	*10,000	11	13.20	4	36.3	0	0	0	0	0
KINGSTON	*21,000	29	16.60	6	20.7	0	0	0	2	0
Ellenville	3,000	1	4.00	0	....	0	0	0	0	0
Marbletown	4,000	3	9.00	2	66.6	0	0	0	0	0
Esopus	4,736	6	15.20	1	16.7	1	0	0	0	0
Saugerties	*4,000	4	12.00	0	....	0	0	0	0	0
POUGHKEEPSIE	*20,200	41	24.35	10	24.4	0	0	1	0	0
Fishkill	10,732	16	17.88	7	43.7	0	0	0	0	0
Wappinger Falls	*5,000	7	16.80	2	28.7	0	0	0	0	0
NEWBURGH	*20,000	41	24.60	9	28.1	0	0	3	0	0
Port Jervis	*9,500	13	16.42	4	30.8	0	0	0	0	0
MIDDLETOWN	*10,000	28	33.60	9	32.2	0	0	0	0	0
Haverstraw	*7,000	15	25.70	4	26.7	0	0	2	1	0
Ramapo	*5,000	5	12.00	0	....	0	0	0	0	0
Rest of district	....	234	......	44	18.8	1	0	2	1	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during January, 1889.

populations preceded by a star (*) are estimated to date; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
280	151	25	89	466	78	218.54	1,005	671	46	256	349	303	573	99	172	125	613
221	117	19	53	269	68	240.61	617	445	27	157	225	180	301	58	116	44	393
41	29	4	34	153	6	186.50	331	166	16	69	97	95	204	31	36	30	174
0	0	0	0	1	0	250.00	0	1	0	1	0	0	1	0	0	0	0
1	0	0	0	2	0	200.00	3	0	0	1	0	3	2	0	1	2	0
3	0	0	0	4	0	157.00	7	10	1	3	3	4	5	2	0	4	2
0	0	0	1	5	0	187.50	9	2	0	1	0	1	2	0	2	2	7
4	0	0	0	2	0	272.72	2	3	0	0	0	0	2	0	0	7	2
1	0	0	0	2	0	166.67	0	2	0	0	1	0	2	0	3	5	2
0	0	0	0	5	0	500.00	0	1	0	0	0	3	0	0	0	1	1
0	0	1	0	1	0	153.20	0	1	0	3	0	0	2	1	0	3	1
0	0	0	0	0	1	111.11	0	0	0	0	0	0	2	0	1	3	2
0	0	0	0	0	0	......	1	1	0	0	0	0	1	0	0	2	1
0	0	0	0	0	0	......	0	2	0	1	2	0	2	0	2	0	0
0	0	0	0	0	0	......	2	1	0	1	0	0	1	0	0	1	0
0	1	0	0	5	0	538.46	2	0	0	0	0	0	2	0	0	1	1
1	0	0	0	0	1	81.10	3	9	0	0	3	1	9	1	2	1	5
0	1	0	0	1	0	153.85	2	3	0	0	1	0	2	0	2	0	1
0	0	0	0	0	0	.....	3	0	0	1	0	0	0	0	0	1	1
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	222.22	2	0	0	0	0	0	1	1	0	2	1
0	1	0	0	0	0	166.67	1	0	1	2	1	1	0	0	0	1	3
0	0	0	0	0	0	......	2	1	0	1	0	1	2	0	2	1	1
6	2	0	1	14	2	147.00	19	22	1	15	16	14	30	5	5	14	14
37	5	1	7	50	4	150.00	138	132	6	38	37	84	96	19	31	83	71
4	3	0	0	13	0	144.44	30	35	0	10	6	33	20	6	6	6	2
0	0	0	0	0	1	100.00	3	3	0	0	0	1	3	0	3	1	4
14	0	0	3	11	1	246.00	19	19	1	3	1	6	17	2	2	13	12
0	0	0	1	0	0	77.00	6	6	0	1	3	3	1	1	0	2	1
0	0	0	0	0	0	......	4	2	0	1	1	1	0	1	1	1	1
0	0	0	0	0	1	58.85	4	1	0	2	2	2	1	0	0	3	1
0	0	0	0	0	0	......	1	1	0	1	0	0	0	0	0	0	0
0	0	0	0	3	0	266.67	4	1	0	3	1	1	1	0	0	0	0
0	0	0	0	0	0	......	2	1	0	0	0	0	1	0	0	0	2
0	0	0	0	0	0	......	0	2	0	0	0	1	0	1	0	0	0
0	0	0	0	0	0	......	4	1	0	0	0	0.	2	0	0	2	2
0	0	0	0	4	0	207.00	4	5	1	2	2	5	1	0	2	1	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	333.33	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	1	0	333.33	1	0	0	0	0	1	0	0	1	0	1
0	0	1	0	0	0	250.00	0	1	0	0	0	0	0	0	0	0	2
0	0	0	2	6	0	219.68	1	7	0	1	2	1	7	2	1	5	5
0	0	0	0	0	0	......	3	2	0	2	0	2	4	0	0	2	1
0	0	0	0	0	0	......	2	2	0	0	0	2	1	0	0	0	0
0	0	0	0	3	0	66.67	11	10	0	0	0	1	4	1	0	4	4
0	0	0	0	1	0	75.20	2	2	1	0	0	0	0	1	0	2	4
5	0	0	0	0	0	161.43	2	1	0	1	3	5	3	0	0	2	6
5	0	0	0	1	0	600.00	0	1	0	0	0	1	1	0	1	1	1
0	0	0	0	0	0	......	0	2	0	0	0	0	0	0	0	3	0
9	2	0	1	6	1	98.00	34	27	3	11	16	18	28	4	14	35	21

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of —	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
ADIRONDACK & NORTHERN DISTRICT:										
Totals	....	290	......	62	20.0	....	....	5	1	....
Argyle	3.700	5	19.46	1	16.7	0	0	0	0	0
Greenwich	3.961	9	27.50	2	22.2	0	0	1	0	0
Salem	3.500	6	20.56	0	....	0	0	0	0	0
Fort Ann	4.267	4	11.50	0	....	0	0	0	0	0
Fort Edward	4.880	5	12.30	1	20.0	0	0	0	5	0
Glens Falls	*10.000	17	20 40	3	19.2	0	0	0	0	0
Crown Point	4.297	3	9.38	0	....	0	0	1	0	0
Malone	*9.000	12	16.00	5	41.7	0	0	0	0	0
Potsdam	*4.000	6	18.00	4	66.7	0	0	0	0	0
OGDENSBURG	*11.000	13	14 18	4	30.8	0	0	0	0	0
Gouverneur	*5.500	7	15.28	0	....	0	0	0	0	0
Ellisburgh	4.811	1	.....	0	....	0	0	0	0	0
Plattsburgh	*7.000	7	12.00	1	14.3	0	0	0	1	0
WATERTOWN	*12.200	20	19 75	7	35.0	0	0	0	0	0
Lowville	3.198	8	30 00	1	12.5	0	0	0	0	0
Clayton	4.324	6	16.75	0	....	0	0	0	0	0
Rest of district	....	161	......	33	20.6	0	0	3	0	0
MOHAWK VALLEY DIST.:										
Totals	....	367	......	79	21.5	1	....	9	....	1
SCHENECTADY	*20.000	24	14 40	6	25.0	0	0	0	0	0
Schoharie	3.350	6	21.50	1	16.7	0	0	0	0	0
Cobleskill	3.371	4	15.00	1	25.0	0	0	0	0	0
AMSTERDAM	*27.000	10	6 00	7	70.0	0	0	0	0	0
Johnstown	*6.000	3	6 00	1	33.3	0	0	0	0	0
Gloversville	*20.000	14	16 80	5	35.7	0	0	0	0	0
Little Falls	7.200	12	20 00	1	8.3	0	0	0	0	0
Herkimer	3.700	2	6 00	0	....	0	0	0	0	0
Ilion	*4.200	1	[illegible]	0	....	0	0	0	0	0
UTICA	*50.000	67	16 08	12	18.1	0	0	2	0	0
Whitestown	5.000	4	9 60	0	....	0	0	0	0	0
ROME	12.045	21	21.00	2	9.5	0	0	0	0	1
Boonville	*4.000	7	21 00	3	42.8	0	0	1	0	0
Camden	3.400	6	21 18	1	16.7	0	0	0	0	0
Waterford	*5.400	11	24 44	5	45.5	0	0	0	0	0
Ballston Spa	3.200	5	18 75	0	....	0	0	0	0	0
Saratoga Springs	*10.000	20	24.00	4	20.0	0	0	0	0	0
Rest of district	....	142	......	30	....	1	0	6	0	0
SOUTHERN TIER DIST.:										
Totals	....	[illegible]	......	52	20.8	4	....	3	2	....
BINGHAMTON	*[illegible]	24	[illegible]	7	29.1	2	0	1	0	0
[illegible]	*[illegible]	5	[illegible]	0	....	0	0	0	0	0
[illegible]	4.323	7	[illegible] 42	2	28.5	0	0	0	0	0
[illegible]	*[illegible]	5	[illegible]	2	[illegible]	0	0	0	0	0
ELMIRA	*[illegible]	[illegible]	14 [illegible]	8	36.7	0	0	1	0	0
Hornellsville	[illegible]	5	......	5	....	0	0	0	0	0
[illegible]	3.500	2	[illegible]	0	....	0	0	0	0	0
[illegible]	*[illegible]	12	[illegible]	[illegible]	[illegible]	0	0	0	0	0
[illegible]	*[illegible]	[illegible]	[illegible]	0	....	0	0	0	0	0
[illegible]	*[illegible]	4	[illegible]	[illegible]	....	0	0	0	0	0
JAMESTOWN	*[illegible]	24	[illegible]	4	28 5	0	0	0	0	0
[illegible]	*[illegible]	[illegible]	[illegible]	[illegible]	....	0	0	0	0	0
Rest of district	....	[illegible]	......	18	14.7	2	0	1	2	0

FOR JANUARY — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhoeal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhoeal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
1	3	....	1	11	4	87.00	53	39	5	13	10	15	41	8	7	47	26
0	0	0	0	0	0	......	1	1	0	1	0	0	0	0	0	2	0
0	0	0	0	0	0	111.11	2	1	0	0	1	1	1	1	0	0	1
0	0	0	0	0	0	......	0	2	1	1	0	0	0	0	0	2	0
0	0	0	0	0	0	......	0	0	1	0	0	1	1	0	0	1	0
0	0	0	0	0	0	200.00	0	2	0	0	0	0	1	1	0	0	0
0	1	0	0	1	0	60.00	1	3	1	1	2	0	3	0	1	2	2
0	0	0	0	0	0	333.33	0	0	0	0	0	0	0	0	0	2	0
0	0	0	0	3	0	250.00	4	0	0	1	0	2	1	0	0	0	1
0	0	0	0	0	1	250.00	1	0	0	0	0	0	2	0	0	0	2
0	1	0	0	0	1	154.00	2	3	0	0	0	2	2	0	0	0	2
0	0	0	0	0	0	......	0	1	0	0	0	1	4	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	9	1	0	0	0	0
0	0	0	0	1	0	285.70	0	2	0	0	0	1	1	0	0	1	0
0	0	0	0	1	0	50.00	4	1	0	2	1	0	4	1	1	3	1
0	0	0	0	0	0	......	1	1	0	2	0	0	2	0	0	2	0
0	0	0	0	0	0	......	1	0	0	0	1	0	1	0	0	3	0
1	1	0	1	5	2	81.25	36	22	1	5	5	7	17	5	5	28	17
2	3	....	1	23	3	120.00	44	46	..	21	10	31	38	11	12	62	42
0	0	0	0	0	1	41.67	4	8	0	1	1	2	4	0	1	1	1
0	0	0	0	3	0	500.00	1	0	0	0	0	0	0	0	1	0	1
0	0	0	0	0	0	......	1	1	0	1	0	1	0	0	0	0	0
1	2	0	0	2	0	500.00	0	1	0	0	1	1	0	0	0	0	2
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	1	1
1	0	0	0	0	0	71.43	2	0	0	0	0	0	0	0	0	2	9
0	0	0	0	1	0	83.40	1	1	0	1	1	0	0	0	0	5	2
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	......	0	0	0	0	0	2	0	0	0	0	0
0	1	0	0	8	2	194.00	8	11	0	1	3	8	7	5	1	6	5
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	1	1	0
0	0	0	1	1	0	142.88	1	4	0	4	0	0	3	2	0	3	1
0	0	0	0	0	0	142.80	2	0	0	0	0	1	0	1	0	2	0
0	0	0	0	0	0	......	1	0	0	0	0	2	2	0	0	1	0
0	0	0	0	0	0	......	3	3	0	1	0	1	0	0	0	0	3
0	0	0	0	0	0	......	1	1	0	1	0	2	0	0	0	0	0
0	0	0	0	2	0	200.00	3	2	0	1	1	1	3	0	1	3	3
0	0	0	0	6	0	90.00	16	13	0	10	3	9	18	3	5	38	14
3	1	....	....	2	1	68.00	46	16	4	19	9	26	32	6	9	45	22
0	0	0	0	0	0	41.68	11	2	0	0	0	1	3	0	1	1	2
0	0	0	0	0	0	......	1	0	0	3	1	0	0	0	0	1	0
0	0	0	0	0	0	......	2	1	0	2	0	0	0	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	2	2
2	0	0	0	0	1	133.33	3	2	0	1	4	6	6	0	2	1	1
0	0	0	0	0	0	......	5	0	1	0	0	0	0	1	0	0	1
0	0	0	0	0	0	......	1	1	0	1	0	1	0	0	0	2	0
0	0	0	0	0	0	......	3	1	0	2	0	2	3	0	0	0	1
0	0	0	0	0	0	......	2	0	0	1	0	1	1	1	1	3	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	1	0	2
0	0	0	0	0	0	......	2	1	0	0	2	2	2	0	1	3	1
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	1	0
1	1	0	0	2	0	73.75	15	8	3	9	1	12	17	4	3	30	11

[illegible]

[illegible]

	Population	Total number of deaths	Representing annual death rate per 1000 of	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro spinal fever	Typhus fever	Typhoid fever	Malarial diseases	Small pox
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during February, 1889.

populations preceded by a star (*) are estimated to date; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
258	123	21	100	431	60	220.00	974	630	60	230	340	296	547	80	156	109	706
208	87	14	53	254	50	213.20	611	430	43	147	250	178	304	51	102	49	460
36	34	6	39	156	8	207.40	292	153	12	51	68	83	188	23	38	35	184
0	0	0	0	0	0	......	1	1	0	0	1	0	1	0	0	0	1
0	1	0	0	1	0	400.00	1	0	0	0	0	0	1	0	1	0	0
2	0	0	1	4	1	225.00	9	4	1	4	1	1	4	0	2	1	5
2	0	0	1	2	0	217.30	4	1	0	1	0	1	3	1	1	0	6
0	0	0	0	0	0	......	5	1	0	0	1	3	3	1	0	1	0
1	0	0	2	0	0	......	0	2	0	3	0	2	4	0	1	4	3
0	0	0	0	0	0	......	0	1	0	0	1	2	0	0	0	0	2
0	0	0	0	0	0	......	0	1	1	0	0	0	2	0	0	0	2
0	0	0	0	1	0	125.00	0	1	1	0	0	2	1	0	0	0	2
0	0	0	0	0	0	......	4	0	0	1	0	0	1	0	0	0	0
0	0	0	0	0	0	......	5	6	0	0	1	2	1	0	0	0	3
0	0	0	0	0	0	......	9	1	0	0	0	1	2	0	0	0	0
0	0	0	1	0	1	153.25	0	1	0	1	2	4	1	0	0	1	1
7	0	0	0	1	0	200.00	9	3	0	1	3	2	8	0	2	3	1
0	0	0	1	0	0	166.67	1	1	0	0	0	1	0	0	0	0	2
0	0	0	0	0	0	......	0	1	0	1	0	0	0	0	0	1	0
0	0	0	0	0	0	......	3	1	0	2	0	0	0	0	2	2	1
0	0	0	0	0	0	......	1	0	0	0	0	1	0	0	1	1	3
1	0	0	0	2	0	300.00	1	1	0	1	0	1	1	0	0	2	0
1	1	1	2	10	0	90.30	27	20	2	17	12	12	22	4	6	9	30
43	7	1	6	49	5	160.00	138	89	10	45	29	106	84	26	25	96	54
4	1	0	0	11	0	132.52	27	20	3	16	6	31	9	7	8	12	5
18	0	0	3	8	2	288.00	19	21	0	2	2	9	11	2	1	10	12
0	0	0	0	1	0	153.25	1	1	0	1	0	2	4	0	0	0	2
0	0	0	0	0	0	.....	1	0	0	1	0	0	0	0	0	0	1
1	0	0	0	2	0	200.00	3	1	1	2	0	2	2	0	0	0	1
0	0	0	0	0	0	......	1	0	0	0	1	0	2	0	0	0	0
0	0	0	0	0	0	......	3	0	0	1	1	1	3	0	0	2	2
0	0	0	0	0	0	......	1	0	0	1	0	1	0	0	1	1	1
0	1	0	0	0	0	153.25	1	2	0	1	1	4	2	0	0	0	0
0	0	0	0	1	0	71.00	2	2	0	1	0	1	3	0	0	1	3
0	0	0	0	5	1	216.31	7	2	3	1	1	7	3	1	1	3	0
0	0	0	0	0	0	......	0	1	1	1	0	1	0	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	1
0	0	0	0	5	0	555.56	1	1	0	0	0	0	0	0	0	2	0
0	0	0	0	0	0	.....	0	2	0	0	0	1	2	0	1	0	2
0	0	0	0	2	0	71.45	8	1	1	1	1	4	9	2	1	6	5
0	0	0	0	1	0	91.90	3	1	0	1	0	1	2	0	1	1	0
0	0	0	1	0	0	142.85	2	0	0	1	0	0	2	0	0	0	1
0	0	0	1	3	0	117.85	9	4	0	2	2	4	5	0	1	2	1
0	0	0	0	0	0	......	2	0	0	0	0	0	0	0	2	2	1
8	0	0	0	0	0	400.00	0	1	0	1	2	1	2	1	0	3	1
3	0	0	0	0	1	363.64	2	1	0	1	1	0	0	1	1	0	2
3	0	0	0	1	0	307.70	4	3	0	0	1	0	1	0	0	0	0
0	0	0	0	0	0	100.00	3	1	0	0	0	0	2	0	0	1	2
6	5	1	1	9	1	160.00	37	24	1	10	10	36	20	12	7	50	14

[illegible]

	Population	Total number of deaths	Representing annual death rate per 1,000 of	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro-spinal fever	Typhus fever	Typhoid fever	Malarial diseases	Small-pox
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

FOR FEBRUARY—(*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhoeal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
3	1	..	1	9	1	76.00	39	25	3	14	9	20	36	10	7	47	21
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	1	1	0	1	1	1	0	0	0	0	0
0	0	0	9	0	0	......	0	1	0	0	0	0	0	0	0	4	0
0	0	0	0	0	0	......	1	1	0	0	1	1	1	0	0	1	0
0	0	0	0	0	0	111.11	1	1	0	0	0	1	2	0	0	1	2
0	0	0	0	0	0	......	0	1	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	1
0	0	0	0	2	0	......	1	0	0	1	0	0	1	0	0	1	3
0	1	0	0	1	0	166.67	1	1	0	0	0	1	1	0	0	1	0
0	0	0	0	1	0	133.33	1	5	1	0	0	1	3	2	0	0	0
0	0	0	0	0	0	......	0	0	1	2	0	1	0	0	0	0	1
0	0	0	0	0	0	......	2	0	0	2	0	0	1	0	1	1	0
0	0	0	0	0	0	......	1	2	0	0	0	1	1	0	0	0	1
0	0	0	0	1	6	71.42	1	1	0	2	0	3	2	0	1	2	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	0
0	C	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	1
3	1	0	1	4	1	80.00	28	11	1	6	7	10	21	7	5	34	11
1	1	..	1	13	2	81.80	55	40	2	20	10	18	48	14	15	49	34
0	0	0	0	1	0	55.60	10	4	0	0	1	2	11	0	1	0	3
0	0	0	0	0	0	200.00	1	1	0	0	0	0	0	0	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	1
1	1	0	0	0	0	158.00	4	1	0	0	0	0	3	1	0	1	6
0	0	0	0	1	0	166.67	1	0	0	2	0	0	2	0	0	0	0
0	0	0	0	0	0	......	6	1	0	0	1	0	2	1	0	1	3
0	0	0	1	0	0	111.11	3	2	0	0	0	1	0	0	0	1	1
0	0	0	0	1	0	250.00	1	1	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	1
0	0	0	0	6	1	187.35	4	5	1	4	2	4	9	4	6	0	0
0	0	0	0	0	0	......	0	3	0	1	0	2	1	1	0	0	0
0	0	0	0	0	0	......	0	5	0	1	0	0	2	1	0	5	0
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	2	0
0	0	0	0	0	0	......	0	2	1	0	0	0	1	0	0	0	0
0	0	0	0	0	0	250.00	1	2	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	66.67	5	0	0	1	0	0	1	2	0	3	2
0	0	0	0	3	1	50.00	19	12	0	11	6	7	13	4	8	34	17
3	2	....	1	4	1	89.00	47	13	3	17	5	24	25	6	9	41	24
0	0	0	0	0	1	64.51	7	1	1	2	1	3	2	0	1	4	8
0	0	0	0	0	0	......	1	1	1	0	0	0	0	0	1	1	1
0	0	0	0	0	0	166.67	2	0	0	1	0	0	0	0	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	0	1
1	0	0	0	1	0	160.00	5	2	1	3	0	0	4	1	1	2	2
1	0	0	0	0	0	500.00	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	2	0	0	0	1	1	0	0	0	2	0
0	0	0	0	0	0	......	0	2	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	......	2	0	0	0	0	1	0	0	1	0	1
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	1	0
0	0	0	0	1	0	125.00	1	0	0	0	0	1	2	1	1	0	1
1	2	0	1	2	0	80.90	27	7	0	10	3	17	16	4	3	28	10
1	1	2	2	18	2	128.00	45	41	3	13	17	33	37	15	10	69	21
0	0	0	0	0	1	285.70	0	1	0	1	0	0	0	0	0	2	1
0	0	0	0	0	0	......	1	0	0	0	0	0	0	2	0	2	0

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
EAST CENT. DIST.—(*Cont.*):										
Cooperstown	*3,000	1	......	0	....	0	0	0	0	0
Oneonta	*7,000	6	10.14	3	50.0	0	0	0	0	0
Worcester	*3,000	1	4.00	0	....	0	0	0	0	0
Brookfield	3,685	4	11.50	1	25.0	0	0	0	0	0
Norwich	5,500	12	26.18	5	41.6	1	0	0	0	0
Hamilton	3,912	7	21.78	0	....	0	0	0	0	0
Baldwinsville	3,000	4	16.00	0	....	0	0	0	0	0
SYRACUSE	*80,000	93	13.95	27	29.0	0	0	3	1	0
Cortland	*9,000	7	9.33	0	....	0	0	1	0	0
Homer	3,000	3	12.00	0	....	0	0	0	0	0
Rest of district	....	200	......	24	12.0	2	0	3	1	†7
WEST CENTRAL DIST.: Totals	....	206	......	33	16.1	2	....	2	....	....
AUBURN	*26,000	33	16.25	10	32.5	0	0	0	0	0
ITHACA	*10,000	5	......	0	....	0	0	1	0	0
Waterloo	*4,500	2	......	0	....	0	0	0	0	0
Hector	*5,000	2	......	0	....	0	0	0	0	0
Seneca Falls	*6,000	11	22.00	1	9.1	0	0	0	0	0
Manchester	*4,000	4	12.00	0	...	0	0	0	0	0
Phelps	*7,000	9	15.43	2	22.2	0	0	0	0	0
Canandaigua	*6,300	4	......	1	25.0	0	0	0	0	0
Geneva	*6,000	3	......	0	....	0	0	0	0	0
Penn Yan	*4,500	5	13.33	1	20.0	1	0	0	0	0
Le Roy	*5,000	8	18.60	1	12.5	0	0	0	0	0
Rest of district	....	120	......	17	14.2	1	0	1	0	0
LAKE ONTARIO AND WESTERN DIST.: Totals	....	799	......	244	30.5	2	....	11	4	1
OSWEGO	*24,000	20	10.00	6	30.0	0	0	0	1	0
Richland	4,000	3	9.00	0	....	0	0	0	0	0
Fulton	*4,000	4	12.00	0	....	0	0	0	0	0
Clyde	*3,000	4	16.00	2	50.0	0	0	0	0	0
Lyons	*6,000	15	30.00	5	33.3	0	0	0	0	1
Newark	3,500	6	20.57	0	....	0	0	0	0	0
Palmyra	*4,800	3	7.50	0	....	0	0	0	0	0
ROCHESTER	*110,000	207	22.58	49	24.0	0	0	3	0	0
Brockport	4,500	6	13.33	1	16.7	0	0	0	0	0
Medina	4,000	3	9.00	2	66.7	0	0	0	0	0
Albion	*5,000	10	24.00	2	20.0	0	0	0	0	0
LOCKPORT	*15,000	5	......	0	....	0	0	0	0	0
Niagara	7,500	3	......	1	33.3	0	0	0	0	0
BUFFALO	*230,000	‡320	18.10	139	43.5	2	0	5	3	0
Tonawanda	5,000	7	16.80	2	28.5	0	0	0	0	0
Amherst	4,578	4	10.50	2	50.0	0	0	0	0	0
Rest of district	....	179	......	33	18.3	0	0	3	0	0
Total for the State	....	8,113	......	2,933	35.8	32	....	71	30	9
Total for February, 1889.	....	8,637	......	2,748	32.0	44	1	84	49	10

† In Onondaga county alms-house. ‡ In Canasseraga.

REMARKS.—The number of reported deaths is less than in January and less than in tion of deaths under five years of age is nearly the same as in January, but higher than caused 170 deaths in each 1,000 deaths and but 154 in February, 1888. The increase is other parts of the State showing no increase. Measles and whooping cough are also is a considerable diminution in the mortality from diphtheria. There were nine deaths Lyons and one in Canasseraga, Allegany county; cases are reported from Dansville and over five years of age. NOTE.—For boundaries of Sanitary

FEBRUARY — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	1	1	2	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	1	2
0	0	0	0	1	0	166.67	2	0	1	1	1	0	3	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	1	1	1	0	0	1	8
0	0	0	0	0	0	......	0	2	0	0	1	0	0	0	0	1	0
0	0	0	1	4	1	104.29	18	18	1	5	6	13	14	4	3	2	1
0	0	0	0	0	0	......	1	2	0	0	0	1	0	0	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	2	0
1	1	2	1	13	0	150.00	23	18	1	8	7	16	16	9	7	53	11
4	....	2	....	3	....	65.00	27	18	2	12	15	20	31	2	9	39	18
0	0	0	0	0	0	......	4	5	0	1	1	4	7	0	2	0	9
0	0	0	0	0	0	200.00	0	1	0	0	0	0	1	0	1	1	0
0	0	0	0	0	0	......	0	0	0	1	1	0	0	0	0	0	0
0	0	0	0	1	0	500.00	0	0	0	0	0	0	0	0	0	1	0
1	0	0	0	0	0	91.90	2	1	0	2	1	0	1	0	0	3	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	3	0
0	0	0	0	0	0	......	0	0	0	0	0	2	2	2	0	3	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	2	1
0	0	0	0	0	0	......	0	0	0	0	1	1	1	0	0	0	0
0	0	1	0	0	0	400.00	0	1	0	0	0	1	0	0	1	0	0
0	0	0	0	0	0	......	2	1	0	0	0	3	0	0	0	1	1
2	0	1	0	2	0	66.67	18	9	2	7	11	9	19	0	5	25	7
11	1	4	8	36	4	102.50	122	91	17	50	36	57	114	30	25	57	118
0	0	0	0	0	0	50.00	0	4	0	2	0	4	5	1	1	1	1
0	0	0	0	0	0	......	1	0	0	0	0	1	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	2	2	0	0	0	0
0	0	0	0	0	0	......	2	0	0	0	1	0	1	0	0	0	0
0	0	0	0	2	0	200.00	5	0	0	2	1	1	0	0	1	2	0
0	0	0	0	0	0	......	0	0	0	1	0	1	1	0	0	2	1
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	1	1	0
0	0	1	5	8	0	85.00	29	29	3	8	12	12	34	4	5	13	41
0	0	0	0	0	0	......	2	1	0	0	2	0	0	0	0	0	1
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	0	1
0	1	0	0	1	0	......	2	0	0	2	1	0	1	0	0	2	0
0	0	0	0	0	0	......	0	0	0	1	1	0	0	0	2	0	1
0	0	0	0	1	0	333.33	0	1	0	0	0	0	0	0	0	1	0
9	0	3	2	16	3	134.37	44	36	8	14	12	24	52	12	14	0	56
0	0	0	0	0	0	......	2	2	1	0	0	0	1	0	1	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	1	1	0	1	0
2	0	0	1	8	1	83.33	33	18	5	14	6	12	15	12	0	33	16
334	136	30	119	563	75	170.00	1,447	947	100	401	461	574	922	183	256	507	996
239	55	39	49	667	85	154.00	1,614	1,112	105	437	434	563	878	193	233	1042	674

Allegany county. § For four weeks ending February 23.

February, 1888; not only for the entire State but for each sanitary district. The propor- of a year ago. The same is true of zymotic diseases, which for the last two months mainly in scarlet fever and this is limited to the Maritime and Hudson Valley districts, more prevalent than a year ago, as shown by their mortality. On the other hand there from small-pox, seven of them occurring in the Onondaga county poor-house, one in Hannibal. Consumption caused 11.57 per cent of all deaths and 15.15 per cent of deaths Districts see Annual Summary.

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of —	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT: Totals	....	6,050	......	2,521	42.0	15	....	28	24	....
NEW YORK CITY	*1,571,558	3,778	28.30	1,634	43.2	14	0	21	11	0
BROOKLYN	*821,525	1,686	24.17	725	43.0	0	0	6	11	0
Gravesend	*5,000	5	12.00	1	20.0	0	0	0	0	0
New Utrecht	*5,000	15	36.00	5	33.3	0	0	0	0	0
Flatbush	*8,000	17	25.50	6	35.3	0	0	0	0	0
LONG ISLAND CITY	*40,000	80	24.00	29	36.2	0	0	0	0	0
Newtown	*10,000	24	28.80	15	62.5	0	0	0	0	0
Oyster Bay	*12,000	8	......	2	....	0	0	0	0	0
Hempstead	18,160	29	19.30	7	....	0	0	0	0	0
North Hempstead	8,000	12	18.00	3	25.0	0	0	0	0	0
Huntington	8,100	10	14,81	0	....	0	0	0	0	0
Southold	7,267	6	10.00	1	16.7	0	0	0	0	0
Sag Harbor	*3,000	5	20.00	0	....	1	0	0	0	0
Edgewater	12,000	12	12.00	0	....	0	0	0	0	0
Port Richmond	*3,600	5	16.67	0	....	0	0	0	0	0
Westfield	7,000	11	18.85	4	36.4	0	0	0	0	0
YONKERS	*30,000	42	16.80	14	32.9	0	0	0	0	0
Westchester	*7,000	10	17.14	2	20.0	0	0	0	0	0
Portchester	*4,000	5	15.00	3	60.0	0	0	0	0	0
Sing Sing	*6,500	8	14.80	0	....	0	0	0	0	0
New Rochelle	*5,500	10	21.82	3	30.0	0	0	0	0	0
Peekskill	7,000	14	24.00	7	50.0	0	0	0	0	0
Rest of district	....	258	......	60	24.0	0	0	1	2	0
HUDSON VALLEY DIST.: Totals	....	988	......	261	26 0	10	....	8	10	....
ALBANY	*103,000	211	24.58	73	34.6	8	0	3	0	0
TROY	*65,000	127	23.44	46	36.2	0	0	1	0	0
West Troy	*13,000	17	13.10	6	35.3	0	0	0	0	0
Hoosick Falls	*6,000	4	8.00	2	50.0	0	0	0	0	0
Lansingburgh	*10,000	18	21.60	5	27.8	0	0	0	0	0
Green Island	*5,000	5	12.00	1	20.0	0	0	0	0	0
Greenbush	*8,000	20	30.00	4	20.0	1	0	1	0	0
Coxsackie	4,000	8	24.00	2	25.0	0	0	0	0	0
Catskill	*4,500	8	21.33	1	12.5	0	0	0	0	0
HUDSON	*10,000	15	18.00	1	6.7	0	0	0	0	0
KINGSTON	*21,000	42	24.00	14	34.3	1	0	0	2	0
Ellenville	3,000	1	4.00	0	....	0	0	0	0	0
Marbletown	4,000	6	18.00	0	....	0	0	1	0	0
Esopus	4,736	11	27.80	3	27.3	0	0	1	0	0
Saugerties	*4,000	13	39.00	2	23.0	0	0	0	0	0
POUGHKEEPSIE	*20,200	39	23.16	9	23.0	0	0	0	0	0
Fishkill	10,732	20	22.43	5	25.0	0	0	0	0	0
Wappinger Falls	*5,000	9	21.60	3	33.3	0	0	0	0	0
NEWBURGH	*20,000	61	36.60	16	26.0	0	0	0	2	0
Port Jervis	*9,500	9	11.35	2	22.2	0	0	0	0	0
MIDDLETOWN	*10,000	19	22.80	6	31.5	0	0	0	0	0
Goshen	4,387	12	32.75	4	25.0	0	0	0	0	0
Haverstraw	*7,000	8	13.85	3	37.5	0	0	0	1	0
Nyack	*5,000	4	8.00	1	25.0	0	0	0	0	0
Ramapo	*5,000	5	12.00	0	....	0	0	0	0	0
Rest of district	....	296	......	52	17.0	0	0	1	5	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during March, 1889.

populations preceded by a star (*) are estimated to date; the remainder are from the of 1880.

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
309	127	22	137	461	86	200.00	1,264	738	81	251	345	342	641	131	131	150	767
249	73	17	83	277	58	212.32	768	485	56	154	216	205	371	76	75	55	513
36	51	4	48	148	15	188.00	402	181	21	79	90	95	205	41	42	34	177
1	0	0	0	0	0	200.00	0	0	0	0	0	1	1	0	2	0	0
2	0	0	1	0	0	200.00	3	1	0	1	0	2	1	0	1	1	2
1	0	0	0	7	0	470.00	2	1	0	0	1	3	0	1	0	1	0
8	1	0	0	0	5	175.00	10	4	0	1	3	5	8	2	2	3	28
0	0	0	0	4	0	166.67	3	3	0	1	1	0	4	0	1	0	7
1	0	0	0	0	0	......	2	0	0	0	0	1	0	2	0	2	0
0	0	0	0	2	1	241.35	4	5	1	2	4	0	2	2	1	2	3
1	0	0	1	0	0	166.67	3	5	0	0	0	2	0	0	0	0	0
0	0	0	0	0	0	......	1	2	1	0	1	2	1	0	0	2	0
0	0	0	0	0	0	......	1	0	0	1	0	0	1	0	1	1	1
0	0	0	0	0	0	200.00	1	0	0	0	0	1	0	0	0	2	0
0	0	0	0	0	0	......	4	2	0	1	0	1	1	1	1	1	0
0	0	0	0	0	0	......	0	0	0	1	1	0	0	1	0	2	0
0	0	0	1	0	1	181.81	1	3	0	0	1	1	3	0	0	0	0
4	0	0	0	2	1	166.67	9	5	1	3	3	5	7	1	1	0	0
0	0	0	0	0	0	......	1	2	0	2	0	1	1	0	0	3	0
0	0	0	0	0	0	......	1	0	0	0	0	0	4	0	0	0	0
0	0	0	0	0	0	......	2	0	0	1	0	1	0	0	0	4	0
0	1	0	0	0	0	100.00	4	1	1	0	0	1	1	0	0	0	1
0	1	0	1	1	0	214.28	2	3	0	1	1	1	1	0	0	1	1
6	0	1	2	20	5	157.00	40	35	0	3	23	14	29	4	4	35	34
45	9	3	5	53	5	148.00	170	137	5	60	42	116	67	23	22	124	73
8	5	1	1	8	1	166.00	34	29	1	14	8	48	3	8	4	18	9
14	1	0	1	8	0	196.00	15	15	0	8	9	17	12	2	3	6	15
0	0	0	0	0	0	......	4	3	0	1	1	0	5	0	1	0	2
0	0	0	0	1	0	250.00	0	0	0	0	0	0	0	1	1	1	0
1	0	0	0	1	0	111.11	5	2	0	4	3	1	0	0	0	0	1
0	0	0	0	2	0	400.00	0	1	0	0	0	0	0	1	0	1	0
1	0	0	0	0	0	150.00	4	2	0	2	0	2	1	2	0	0	4
1	0	0	0	0	0	125.00	4	1	0	0	0	0	0	0	0	2	0
0	0	0	0	0	0	......	2	1	0	0	0	2	0	0	0	0	3
0	0	0	0	0	0	......	4	1	0	1	1	2	1	0	1	3	1
0	0	2	0	1	2	190.43	8	8	3	4	0	5	4	1	1	0	0
0	0	0	0	0	0	......	0	0	0	0	0	6	0	0	0	1	0
0	0	0	0	0	0	166.67	1	0	0	1	0	0	0	0	0	1	2
0	0	0	0	3	0	363.63	1	1	0	1	1	2	1	0	0	0	0
0	0	0	1	2	0	180.00	4	2	0	0	0	1	0	0	0	3	0
0	1	0	1	5	0	180.00	5	9	0	2	0	2	3	2	1	6	2
1	0	0	0	1	1	150.00	2	3	0	3	1	2	1	0	0	3	2
0	0	0	1	0	0	111.11	2	3	0	0	0	0	1	0	0	1	1
0	0	0	0	4	0	98.00	14	10	1	4	2	4	3	1	1	7	8
0	0	0	0	0	0	......	1	0	0	1	0	3	0	0	2	0	2
3	0	0	0	0	0	157.50	1	1	0	0	1	1	4	1	0	5	2
3	0	0	0	2	0	416.67	3	1	0	0	0	0	0	0	0	2	1
3	0	0	0	1	0	625.00	3	2	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	0	2	0	0	0	0	0	1	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	3	0
10	2	0	0	14	2	113.30	56	40	0	14	15	23	27	3	7	60	17

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of —	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
ADIRONDACK & NORTHERN DISTRICT:										
Totals	....	276	.....	62	23.0	1	..	5	2	...
Argyle	3,700	4	13.00	1	25.0	0	0	0	0	0
Greenwich	3,861	10	30.75	1	10.0	0	0	0	0	0
Salem	3,500	2	7.00	0	....	0	0	0	0	0
Fort Ann	4,267	2	......	1	50.0	0	0	0	0	0
Fort Edward	4,880	3	......	1	33.3	0	0	0	0	0
Glens Falls	*10,000	15	18.00	5	33.3	0	0	1	0	0
Crown Point	4,287	3	8.40	1	33.3	0	0	0	0	0
Malone	*9,000	9	12.00	2	24.0	0	0	0	0	0
Potsdam	*4,000	7	21.00	3	42.8	0	0	0	0	0
OGDENSBURG	*11,000	21	22.90	7	33.3	0	0	1	1	0
Gouverneur	*5,500	5	10.91	2	40.0	0	0	0	0	0
Ellisburgh	4,811	5	12.50	0	....	0	0	0	0	0
Plattsburgh	*7,000	7	12.00	1	14.3	0	0	0	0	0
WATERTOWN	*12,000	13	12.80	1	7.7	0	0	0	0	0
Clayton	4,314	2	......	0	....	0	0	0	0	9
Rest of district	....	168	......	36	20.8	1	0	3	1	0
MOHAWK VALLEY DIST:										
Totals	....	405	......	88	22.0	3	..	5	..	...
SCHENECTADY	*20,000	25	15.00	14	56.0	0	0	0	0	0
Schoharie	3,350	6	21.50	1	16.7	0	0	0	0	0
Cobleskill	3,371	6	21.36	0	....	0	0	0	0	0
AMSTERDAM	*20,000	16	13.72	7	43.7	0	0	0	0	0
Johnstown	*6,000	13	26.00	1	....	0	0	2	0	0
Gloversville	*10,000	15	18.00	7	46.7	0	0	0	0	0
Little Falls	7,200	8	......	3	....	0	0	0	0	0
Herkimer	3,000	1	4.00	1	100.0	0	0	0	0	0
Ilion	*4,200	3	......	1	....	0	0	0	0	0
UTICA	*50,000	72	17.28	17	23.7	1	0	1	0	0
Whitestown	5,000	3	......	0	....	0	0	0	0	0
ROME	12,045	18	18.00	5	27.3	1	0	0	0	0
Boonville	*4,000	6	18.00	0	....	0	0	0	0	0
Camden	3,400	5	17.68	0	....	0	0	0	0	0
Waterford	*5,400	16	35.55	5	31.2	0	0	0	0	0
Ballston Spa	3,200	7	26.25	2	28.5	0	0	0	0	0
Saratoga Springs	*10,000	15	18.00	2	13.3	0	0	0	0	0
Rest of district	....	170	......	22	13.0	1	0	2	0	0
SOUTHERN TIER DIST.:										
Totals	....	327	......	62	24.7	....	....	4	....	....
BINGHAMTON	*30,000	44	17.60	11	25.0	0	0	0	0	0
Owego	*6,000	8	16.00	1	12.5	0	0	0	0	0
Candor	4,323	5	13.90	2	40.0	0	0	0	0	0
Waverly	3,600	5	20.00	1	20.0	0	0	0	0	0
ELMIRA	*25,000	38	17.24	11	29.0	0	0	0	0	0
Horseheads	3,500	4	13.71	0	....	0	0	1	0	0
Bath	3,500	2	.....	0	....	0	0	0	0	0
Corning	*8,000	15	24.00	2	12.5	0	0	0	0	0
Olean	*8,000	16	22.50	3	19.4	0	0	1	0	0
Salamanca	*6,000	3	... ..	1	....	0	0	0	0	0
Westfield	3,000	4	16.00	1	25.0	0	0	0	0	0
Rest of district	....	183	......	29	15.5	0	0	2	0	0
EAST CENTRAL DIST.:										
Totals	....	392	......	81	20.0	4	....	3	1	....
Walton	3,540	5	16.80	3	60.0	0	0	0	0	0
Delhi	3,000	4	16.00	2	50.0	0	0	0	0	0

MARCH — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
......	2	1	1	7	2	78.50	44	36	3	18	9	23	26	5	6	49	36
0	1	0	0	0	0	250.00	1	0	0	0	0	0	0	0	0	2	0
0	0	0	0	1	1	200.00	0	1	0	0	0	0	1	0	1	4	1
0	0	0	0	0	0	......	1	0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	1	1
0	0	0	0	2	0	200.00	5	3	0	0	1	0	0	0	0	1	2
0	0	0	0	0	0	......	2	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	2	0	0	1	0	2	1	1	0	1	1
0	0	0	0	0	0	......	1	1	0	0	1	1	0	1	0	0	2
0	0	1	0	0	0	142.88	2	3	0	1	0	2	1	0	0	3	6
0	0	0	0	0	0	......	2	1	0	0	0	1	0	0	0	0	1
0	0	0	0	0	0	......	2	0	0	1	0	1	0	0	0	1	0
0	0	0	0	0	0	......	1	1	1	0	0	1	1	0	0	1	1
0	0	0	0	0	0	......	1	2	0	0	0	1	2	1	1	3	2
0	0	0	0	0	0	......	0	0	0	0	0	0	0	1	0	1	0
0	1	0	1	4	0	70.00	23	23	2	15	7	13	20	1	4	30	18
7	1	....	....	12	4	80.00	60	52	3	27	15	40	45	17	12	65	37
0	0	0	0	0	0	......	13	3	0	1	2	1	4	0	0	0	1
0	0	0	0	1	0	166.67	3	2	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	1	0	1	0	1	0	1	0	2	0
3	1	0	0	0	0	250.00	3	2	0	1	0	1	3	0	1	1	0
0	0	0	0	0	0	76.95	1	3	0	1	0	2	0	0	0	3	1
1	0	0	0	0	0	66.67	2	0	1	0	1	1	1	1	0	3	4
0	0	0	0	0	0	......	0	1	0	0	0	1	4	0	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	1	0	......	0	0	0	1	0	0	0	0	0	1	0
2	0	0	0	7	3	194.44	4	10	2	3	2	5	12	5	2	7	6
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	55.55	4	0	0	1	0	3	4	1	0	2	2
0	0	0	0	0	0	......	0	2	0	1	0	1	0	1	0	1	0
0	0	0	0	0	0	......	0	1	0	0	2	0	0	0	0	1	1
0	0	0	0	0	1	62.50	1	5	0	1	0	0	2	0	0	1	5
0	0	0	0	0	0	......	1	0	0	0	0	2	3	0	0	0	1
0	0	0	0	1	0	66.66	0	3	0	2	3	2	1	0	0	0	3
1	0	0	0	2	0	35.20	27	18	0	14	5	20	11	8	9	41	11
4	1	1	2	4	4	60.75	59	37	1	22	11	34	46	12	13	41	31
0	0	0	0	0	1	22.73	9	2	0	1	2	5	9	3	3	2	7
0	0	0	0	0	0	......	1	2	0	1	0	0	0	0	0	2	2
0	0	0	0	0	0	......	0	1	0	1	0	1	0	0	0	0	2
0	0	0	0	0	0	......	0	3	0	0	0	1	0	0	0	0	1
0	0	0	0	0	2	26.40	13	3	0	2	0	3	5	3	1	1	6
0	0	0	0	0	0	250.00	0	1	0	0	0	0	1	0	0	1	0
0	0	0	0	1	0	......	0	0	0	0	0	0	0	0	0	1	0
0	0	1	0	0	0	62.50	2	3	0	2	3	0	2	1	0	1	0
0	0	0	0	0	0	62.50	3	1	0	0	0	3	4	1	1	0	2
0	0	0	0	0	0	......	0	0	0	1	0	1	0	0	0	0	1
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	0	1	1
4	1	0	2	3	2	77.00	30	20	1	14	6	20	25	4	8	32	9
10	7	1	2	5	3	90.00	74	53	3	22	19	34	34	6	12	77	22
0	0	0	0	0	0	......	1	1	0	1	1	1	0	0	0	0	0
1	0	0	0	0	0	250.00	0	1	0	0	0	0	1	0	0	0	0

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

[Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of —	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT: Totals	....	5,690	......	2,356	41.4	26	..	25	46	..
NEW YORK	*1,571,558	3,593	27.80	1,544	43.0	25	0	18	21	0
BROOKLYN	*821,525	1,517	22.47	667	43.9	0	0	2	18	0
Gravesend	*5,000	8	19.20	3	37.5	0	0	0	0	0
New Utrecht	*5,000	13	51.20	2	15.4	0	0	0	0	0
Flatbush	*8,000	17	25.25	6	35.3	0	0	0	1	0
LONG ISLAND CITY	*40,000	57	17.10	17	30.0	0	0	0	0	0
Newtown	*10,000	35	42.00	16	45.7	0	0	0	0	0
Oyster Bay	*12,000	15	15.00	4	26.7	0	0	0	0	0
Hempstead	18,160	21	14.00	10	47.6	0	0	0	0	0
North Hempstead	8,000	9	13.50	2	22.2	0	0	0	0	0
Huntington	8,100	12	18.00	1	8.3	0	0	0	0	0
Southold	7,367	5	8.00	0	....	0	0	0	1	0
Sag Harbor	*3,000	9	36.00	2	22.2	0	0	0	0	0
New Brighton	*15,000	29	23.20	5	17.2	0	0	1	1	0
Edgewater	12,000	15	15.00	7	46.7	0	0	0	0	0
Port Richmond	*3,600	8	26.67	3	37.5	0	0	0	0	0
Westfield	7,000	10	17.14	1	10.0	0	0	0	0	0
YONKERS	*30,000	37	14.80	14	37.9	0	0	0	0	0
Westchester	*6,900	12	20.87	5	41.7	0	0	0	0	0
Portchester	*4,000	3	9.00	1	33.3	0	0	0	0	0
Sing Sing	*6,500	8	14.77	1	12.5	0	0	0	0	0
New Rochelle	*5,500	12	26.20	4	33.3	0	0	0	1	0
Peekskill	7,000	12	20.57	1	8.3	0	0	0	0	0
Rest of district	....	233	......	40	17.2	1	0	4	3	0
HUDSON VALLEY DIST.: Totals	....	1,030	......	246	24.0	3	..	21	5	..
ALBANY	*103,000	194	22.60	51	26.3	2	0	8	0	0
COHOES	*20,000	33	18.90	11	33.3	0	0	1	0	0
TROY	*65,000	131	24.00	47	36.2	1	0	2	1	0
West Troy	*13,000	32	29.54	5	15.0	0	0	1	0	0
Hoosick Falls	*6,000	8	16.00	4	50.0	0	0	0	0	0
Lansingburgh	*10,000	17	20.40	4	23.5	0	0	1	0	0
Green Island	*5,000	9	21.60	2	22.2	0	0	0	0	0
Greenbush	*8,000	16	24.00	5	31.3	0	0	0	0	0
Coxsackie	4,000	9	27.00	3	33.3	0	0	0	0	0
Catskill	*4,500	13	34.60	4	30.7	0	0	0	0	0
HUDSON	*10,000	12	14.40	4	33.3	0	0	0	0	0
KINGSTON	*21,000	40	22.90	12	30.0	0	0	0	1	0
Ellenville	3,000	5	20.00	0	....	0	0	0	0	0
Marbletown	4,000	14	42.00	4	28.5	0	0	0	0	0
Esopus	4,736	12	30.42	3	25.0	0	0	0	0	0
Saugerties	*4,000	9	27.00	3	33.3	0	0	0	0	0
POUGHKEEPSIE	*20,200	38	22.57	6	15.8	0	0	0	0	0
Fishkill	10,732	22	24.58	6	27.3	0	0	0	1	0
Wappinger Falls	*5,000	8	19.20	2	25.0	0	0	0	0	0
NEWBURGH	*20,000	40	24.00	9	22.5	0	0	3	0	0
Port Jervis	*9,500	21	26.51	4	19.0	0	0	0	0	0
MIDDLETOWN	*10,000	18	21.60	3	16.6	0	0	0	0	0
Goshen	4,387	11	30.00	1	9.1	0	0	0	0	0
Nyack	*5,000	7	16.40	3	42.8	0	0	0	0	0
Ramapo	*5,000	1	......	0	....	0	0	0	0	0
Rest of district	....	309	......	50	16.3	0	0	5	2	0

York State Board of Health.

following districts, cities and towns, during April, 1889.

populations preceded by a star (*) are estimated to date ; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
305	104	34	114	472	91	213.70	1,074	689	72	243	336	293	565	117	185	140	759
229	60	23	85	289	66	226.66	667	426	52	156	229	174	303	68	129	57	516
46	43	9	19	143	21	198.60	314	187	9	61	72	84	197	29	31	34	198
0	0	0	1	0	1	250 00	0	1	0	0	1	0	2	0	1	0	1
0	0	0	0	1	1	153.85	0	1	1	0	0	0	3	0	1	5	0
1	0	0	1	2	0	294.10	2	1	1	1	0	3	1	0	1	0	2
10	0	0	2	6	0	315.80	6	7	0	3	3	3	6	2	2	3	4
0	0	0	0	8	0	228,50	5	6	0	2	0	2	4	2	0	3	3
0	0	0	0	0	0	......	1	1	0	1	1	0	5	1	1	3	1
1	0	0	2	2	0	238.00	2	1	0	0	0	1	4	1	2	1	4
1	0	0	0	1	0	222.22	1	2	0	0	0	2	0	1	0	0	1
0	1	0	0	0	0	83.33	3	2	0	0	5	0	0	0	0	0	1
0	0	0	0	0	0	200.00	0	0	0	0	0	1	1	0	1	1	0
0	0	0	0	0	0	......	0	2	0	1	0	0	2	0	0	2	2
3	0	0	0	2	0	241.40	2	2	2	3	4	1	2	1	0	5	0
0	0	0	1	3	0	266.67	1	2	0	1	1	0	1	0	2	1	2
1	0	0	0	0	0	125.00	2	0	0	0	2	0	0	0	1	0	2
0	0	0	0	1	0	100.00	1	4	0	0	1	2	1	0	0	0	0
3	0	0	0	1	0	108.11	7	4	1	0	2	4	9	2	0	2	2
1	0	0	1	1	0	250.00	3	0	1	0	2	1	1	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	1	0
0	0	0	0	1	0	125.00	2	1	0	0	2	0	1	0	0	1	0
0	0	0	0	2	0	333.33	3	1	1	0	1	0	2	1	0	0	0
0	0	0	1	1	0	166.67	4	2	0	0	0	1	0	0	0	2	1
9	0	2	1	8	2	129.00	48	36	4	14	10	13	19	9	13	18	19
38	24	3	2	35	7	137.00	213	130	12	46	45	91	109	31	27	114	74
4	6	1	0	11	2	175.25	48	23	2	10	11	25	23	2	4	4	8
0	8	0	0	0	0	272.72	7	4	0	1	1	3	6	0	0	0	2
11	0	1	1	4	0	161.50	26	13	0	4	7	8	14	3	3	15	17
1	0	0	0	1	0	93.75	5	5	0	1	3	5	4	2	0	2	2
0	0	0	0	1	0	125.00	1	0	0	3	0	0	1	0	0	0	2
0	0	0	0	0	0	60.00	3	1	0	1	0	2	0	2	1	5	2
0	0	0	0	0	1	111.11	1	4	0	1	0	0	1	0	1	0	0
0	2	0	0	0	0	125.00	3	1	0	0	0	4	3	0	1	1	1
0	0	0	0	0	0	......	5	0	0	0	0	0	1	0	0	2	1
0	0	0	0	0	0	......	2	2	0	0	0	0	3	1	1	0	4
0	0	0	0	1	1	166.67	0	1	0	2	1	2	0	3	0	0	1
3	3	1	0	1	2	275.00	7	2	0	1	2	11	2	0	1	3	0
0	0	0	0	0	0	......	1	1	0	0	1	0	0	1	0	1	0
0	0	0	0	1	0	71.25	9	0	0	0	0	1	0	0	0	3	0
0	1	0	0	3	0	333.33	0	2	1	1	1	0	0	0	0	2	1
0	0	0	0	1	0	111.11	3	2	0	0	0	0	1	0	0	2	0
0	1	0	0	1	0	52.00	8	7	1	1	1	3	2	2	2	7	2
0	0	0	0	0	0	45.45	8	0	0	1	1	1	3	0	2	4	1
0	0	0	0	0	0	......	3	0	1	1	0	0	1	0	1	0	1
0	1	0	0	5	0	225.00	10	6	1	2	1	1	2	2	0	4	2
0	0	0	0	0	0	......	1	5	1	0	0	2	4	0	2	2	4
3	0	0	0	0	0	166.67	5	3	0	0	1	0	2	1	0	2	1
3	0	0	0	0	0	282.82	1	1	0	0	2	1	0	2	0	1	0
0	0	0	0	0	0	......	0	1	0	0	1	1	1	0	0	1	2
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	0
13	2	0	1	5	5	96.50	56	45	5	16	11	21	35	10	8	53	20

	Population	Total number of deaths	Corresponding annual death rate per 1000	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro-spinal fever	Typhus fever	Typhoid fever	Malarial diseases	Small-pox
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APRIL — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
....	3	1	2	4	3	84.00	36	37	4	22	7	21	29	8	7	58	24
0	0	0	0	0	0	125.00	1	1	0	1	0	0	0	0	0	4	0
0	0	0	0	1	0	142.85	0	0	0	0	0	0	3	0	0	3	0
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	1	0
0	0	0	0	0	0	......	2	0	0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	250.00	0	1	0	0	0	1	0	0	0	1	0
0	0	0	0	0	0	111.11	1	2	0	2	1	1	4	1	0	3	1
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	1	1
0	1	0	0	1	0	166.66	1	2	0	1	0	0	2	0	1	1	2
0	0	0	0	0	0	......	0	2	0	0	0	1	0	0	0	2	0
0	0	0	0	0	0	66.67	2	6	0	0	0	3	0	0	0	1	2
0	0	1	1	0	1	500.00	0	0	0	0	1	2	1	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	1	2	1	2	0	4	0
0	1	0	0	0	0	285.70	0	1	0	1	0	0	0	0	1	1	1
0	0	0	0	0	0	......	4	1	2	1	0	1	1	1	1	4	1
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	0	0	1
0	0	0	0	0	1	200.00	1	0	0	0	1	1	0	0	0	1	0
0	1	0	1	1	1	41.10	23	19	2	16	2	9	15	4	4	31	15
1	6	1	2	13	3	90.00	73	49	6	25	14	32	43	12	22	65	25
0	0	0	0	0	0	31.25	4	5	0	1	2	9	6	0	2	0	2
0	0	0	0	0	0	......	0	3	0	0	0	0	1	1	0	0	0
0	0	0	0	0	0	......	1	1	0	0	1	0	0	0	0	1	1
0	5	0	0	4	0	243.24	8	4	0	0	0	6	4	0	1	2	3
0	0	0	0	0	0	......	3	2	0	0	0	0	1	2	0	0	0
0	0	0	0	0	1	125.00	5	1	0	0	3	1	3	0	0	0	1
0	0	0	0	0	0	......	2	2	0	2	1	0	0	0	1	1	1
0	0	0	0	0	0	......	2	1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	1	0	0	0	0	1	1	0	0	1	0
0	0	0	0	6	2	117.00	12	10	2	5	4	5	10	2	5	8	5
0	0	0	0	0	0	200.00	1	0	0	0	0	1	1	2	0	2	1
0	0	0	2	1	0	136.37	5	1	0	2	0	1	2	1	0	6	1
0	0	0	0	0	0	......	0	0	0	1	0	1	1	0	1	1	0
0	0	0	0	0	0	200.00	0	2	0	0	0	0	1	0	1	0	0
0	0	0	0	0	0	......	0	1	1	0	1	0	0	1	3	2	1
0	0	0	0	0	0	......	1	2	0	0	0	0	0	0	1	2	1
1	0	0	0	0	0	45.50	4	3	1	1	0	0	2	1	0	5	4
0	1	1	0	2	0	65.00	24	11	2	13	2	7	10	2	7	34	3
2	4	2	1	8	5	110.00	47	38	2	20	14	27	42	10	7	39	18
1	0	0	0	2	4	190.00	6	3	1	3	2	10	4	0	1	3	1
0	0	0	0	0	0	222.22	1	0	0	1	0	2	1	0	1	1	0
0	0	0	0	0	0	......	1	1	0	1	1	1	0	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	1	0
0	0	0	0	0	0	90.00	6	5	1	2	2	1	9	1	0	1	4
0	0	0	0	0	0	......	0	0	0	0	0	2	0	0	0	2	0
0	0	0	0	0	0	142.85	2	1	0	0	0	1	2	0	0	0	0
0	0	0	0	0	0	......	2	2	0	0	0	0	4	0	0	2	2
0	0	0	0	0	0	333.33	0	0	0	0	2	0	0	0	0	0	0
0	0	1	0	0	0	142.85	1	1	0	0	0	1	3	3	0	1	2
0	0	0	0	0	0	......	1	1	0	2	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	0	1	0
1	4	1	1	6	1	121.83	27	23	0	11	6	9	17	6	5	25	8

MONTHLY BULLETIN.

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of [illegible]	Deaths under five years.	Percentage of deaths under five years to total deaths.	[illegible]	[illegible]	[illegible]	[illegible]
EAST CENTRAL DIST.									
Totals	....	[illegible]	.	[illegible]	[illegible]	.	...	.	
Walton	[illegible]	[illegible]	[illegible]	[illegible]	..	[illegible]	[illegible]	[illegible]	.
Delhi	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Cooperstown	[illegible]	[illegible]	[illegible]	[illegible]	..	[illegible]	[illegible]	[illegible]	.
Oneonta	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.
Worcester	[illegible]	[illegible]	[illegible]	[illegible]	...	[illegible]	[illegible]	[illegible]	.
Brookfield	[illegible]	[illegible]	[illegible]	[illegible]	..	[illegible]	[illegible]	[illegible]	.
Norwich	[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]	[illegible]	[illegible]	.
Hamilton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.
SYRACUSE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Cortland	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Homer	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.
Rest of district	....	[illegible]	...	[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]
WEST CENTRAL DIST.									
Totals	. .	[illegible]	......	[illegible]	[illegible]	[illegible]	..	[illegible]	[illegible]
AUBURN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]
ITHACA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]	[illegible]	[illegible]	[illegible]	
Hector	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	.
Seneca Falls	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	
Manchester	[illegible]	[illegible]	[illegible]	.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Phelps	[illegible]	[illegible]	.	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	...	[illegible]		[illegible]	[illegible]	[illegible]	.
Geneva	[illegible]	[illegible]	[illegible]	.	[illegible]	.	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	...	[illegible]	.	[illegible]	[illegible]	[illegible]	[illegible]
Rest of district		[illegible]	. ..	[illegible]	[illegible]	[illegible]	[illegible]	.	.
LAKE ONTARIO AND WESTERN DISTRICT									
Totals		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	.
OSWEGO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Richland	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lyons	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Palmyra	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ROCHESTER	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LOCKPORT	[illegible]	[illegible]	.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Niagara	[illegible]	[illegible]		.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tonawanda	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Amherst	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rest of district		[illegible]	...	[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]
Totals for the State		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
Totals for April, [illegible]	....	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* For four we[illegible]

[illegible] March, which was also the [illegible] [illegible] the mortality from [illegible] [illegible] [illegible] in new locality and has [illegible] [illegible] March [illegible] From consumption there were [illegible]

NOTE.—For boundaries of districts [illegible]

APRIL — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
9	4	1	....	6	5	85.00	55	31	8	23	16	32	51	12	14	63	18
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	1	0
0	0	0	0	1	0	333.33	0	0	0	1	0	0	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	1	1	1	0	0	1	1
0	0	0	0	0	0	......	2	0	0	1	2	2	1	0	1	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	1	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	1	2	2	0
1	0	0	0	0	0	......	1	0	0	0	0	2	1	1	0	0	0
0	0	0	0	0	0	125.00	0	0	1	1	1	1	1	0	0	1	1
6	0	1	0	2	2	113.00	17	18	5	7	6	12	25	2	6	9	3
0	0	0	0	0	0	......	1	0	0	0	0	0	2	0	1	1	0
0	0	0	0	0	0	......	2	1	1	0	0	0	2	1	0	0	0
2	4	0	0	3	3	75.00	31	12	1	13	6	14	17	6	4	45	13
3	1	1	1	6	2	95.70	31	27	2	15	13	23	25	8	11	41	20
4	0	0	0	2	1	125.00	3	4	0	4	1	6	6	2	3	3	3
0	0	0	0	1	0	111.11	3	0	0	0	1	0	2	0	1	0	1
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	2	2
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	0	0	0
2	0	0	0	0	0	230.70	2	1	0	1	1	0	3	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	1	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	250.00	1	2	0	0	1	1	1	1	1	1	0
0	0	0	0	0	0	......	0	0	0	1	0	1	0	0	0	1	1
0	0	0	0	0	0	......	0	2	0	0	1	0	1	0	0	0	0
0	1	1	1	3	1	78.50	21	16	2	9	8	13	9	5	6	30	11
5	2	4	15	36	6	106.25	127	91	19	35	33	55	122	24	38	70	91
0	0	0	0	0	0	43.50	4	2	1	2	1	2	5	1	2	1	1
0	0	0	0	0	0	......	0	0	0	0	1	0	2	0	2	1	1
0	0	0	0	0	0	......	0	0	0	1	0	0	1	0	0	2	1
0	0	0	0	0	0	......	2	2	1	0	1	0	0	2	0	1	0
0	0	0	0	1	0	222.22	0	0	1	1	1	1	2	0	0	0	1
0	0	0	0	0	0	......	0	1	0	0	0	1	0	0	0	1	0
0	0	0	0	0	0	......	2	0	0	0	0	0	1	1	0	1	0
0	0	1	8	17	3	171.80	23	17	5	6	12	14	35	6	6	12	9
0	0	0	0	0	0	......	0	1	0	0	0	1	1	0	0	1	0
0	0	0	0	0	0	......	1	0	0	0	1	0	1	0	0	0	0
0	0	0	0	0	0	......	0	1	0	0	0	1	1	0	0	4	2
0	0	0	0	1	0	125.00	3	0	0	0	0	2	0	1	0	0	1
0	1	0	0	0	0	200.00	0	0	0	0	0	0	0	1	2	0	2
5	0	2	5	15	3	130.80	57	43	7	15	9	15	63	7	17	14	52
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	......	2	1	0	0	0	2	1	0	0	0	0
0	1	1	2	2	0	40.50	32	23	4	10	7	16	9	5	10	30	20
363	148	47	137	580	122	174.20	1,656	1,092	125	429	478	574	986	222	311	590	1029
250	77	34	48	448	113	......	1,332	1,117	90	407	404	549	966	186	265	738	890

ending April 27.
in 1888. The rate of infant mortality is less than in March, but still continues higher than that of last year.
is relatively about the same as reported upon in the last issue, both in proportion and distribution. Two
ably, ceased to exist in all heretofore reported. The proportion of deaths from all zymotic diseases is a little
in each 1,000 deaths from all causes (twelve per cent), and 183 in each 1,000 deaths above five years of age.
Districts, see Annual Summary.

[illegible]

[illegible]

	Population	Total number of deaths	Rate per 1,000	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro-spinal fever	Typhus fever	Typhoid fever	Malarial diseases	Small-pox
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wappinger's Falls	*5,000	7	16.80	1	14.3	0	0	0	0	0
Newburgh	*2[illegible],000	4[illegible]	2[illegible]	11	23.8	0	0	0	0	0
Port Jervis	*9,500	11	13.[illegible]	1	9.1	0	0	0	0	0
Middletown	*10,000	[illegible]	......	2	....	0	0	0	0	0
Goshen	4,[illegible]	1	......	0	....	0	0	0	0	0
Haverstraw	*7,000	21	36.00	7	33.3	0	0	0	0	0
Nyack	*5,000	8	19.20	2	25.0	0	0	1	0	0
Ramapo	*5,000	5	12.00	3	60.0	0	0	0	0	0
Rest of district	....	249	......	45	18.0	0	0	4	3	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during May, 1889.

populations preceded by a star (*) are estimated to date; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
211	55	26	98	397	96	182.36	824	682	52	280	297	342	571	119	218	122	759
150	29	18	67	247	67	194.85	485	417	37	159	179	200	291	72	148	52	508
38	25	7	28	127	26	173.73	287	188	10	88	89	94	207	33	39	29	196
0	0	0	0	0	0	......	1	0	1	1	0	0	0	0	0	0	1
0	0	0	1	0	0	58.75	4	2	0	0	0	3	1	0	4	0	2
3	0	1	0	7	0	210.00	5	6	0	2	3	3	8	1	2	3	6
1	0	0	0	0	0	333.33	0	1	1	0	0	2	0	0	0	0	0
1	0	0	0	3	0	190.50	1	2	0	1	0	2	5	1	1	4	6
1	0	0	0	0	0	......	1	1	0	0	0	1	0	0	1	3	0
0	1	0	1	1	0	125.00	1	2	0	1	1	5	4	3	1	1	1
2	0	0	0	1	0	272.72	1	2	0	0	0	2	1	0	0	0	2
0	0	0	0	0	1	91.90	0	2	0	2	0	1	2	0	0	2	1
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	1	1	0	1	1	1	0
1	0	0	0	3	0	146.46	2	0	0	2	4	3	8	0	0	3	2
1	9	0	0	1	1	150.00	1	3	0	2	1	2	1	1	3	1	2
0	0	0	0	0	0	333.33	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	0	66.67	3	2	1	0	2	2	3	0	1	0	0
6	0	0	1	2	1	207.52	5	8	1	2	3	2	12	2	2	0	5
0	0	0	0	1	0	60.00	3	2	0	1	1	1	1	0	5	0	2
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	1	1
0	0	0	0	0	0	......	0	2	0	1	0	1	0	0	1	2	2
0	0	0	0	0	0	......	1	1	0	0	0	3	0	0	1	1	1
1	0	0	0	0	0	83.33	1	3	0	2	2	1	1	0	1	0	0
6	0	0	0	4	0	65.55	21	38	1	15	11	11	24	5	7	18	18
48	40	3	7	39	7	182.50	108	121	8	56	41	74	101	23	38	101	74
6	6	0	1	10	2	160.00	26	36	2	14	13	27	23	6	10	14	3
0	24	1	0	0	0	508.50	5	5	0	4	1	2	6	0	2	0	1
10	1	1	0	2	1	162.55	17	14	1	4	5	11	17	6	3	5	20
2	1	1	0	1	1	363.63	2	2	0	2	0	2	2	0	2	0	2
0	0	0	0	0	0	......	0	0	1	0	1	1	0	0	0	0	2
0	0	0	0	0	1	55.55	1	1	0	2	0	0	3	2	0	3	5
0	0	0	0	0	0	......	1	1	0	0	1	0	0	0	2	0	2
5	0	0	0	3	0	528.50	0	1	0	1	0	0	0	0	1	1	4
1	0	0	0	0	0	166.67	0	0	0	1	0	0	1	0	0	3	0
0	0	0	0	0	0	......	2	0	0	0	0	0	2	0	0	0	0
1	0	0	0	0	0	100.00	2	1	0	1	0	2	1	0	0	2	0
0	4	0	1	0	2	375.00	4	3	0	1	2	2	1	0	2	2	0
1	0	0	0	0	0	......	1	2	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	1	1	0	0	0	1	0	0	1	0	1
1	0	0	0	0	0	400.00	0	1	0	2	0	0	0	0	0	0	0
1	1	0	0	0	0	88 25	2	5	0	2	1	2	6	1	1	6	5
0	0	0	0	0	0	......	2	3	0	3	1	0	2	0	0	2	2
1	1	0	0	0	0	285.71	1	1	0	0	2	0	0	0	1	0	0
1	0	0	1	6	0	173.90	5	10	0	4	0	4	3	0	2	7	3
1	0	0	0	0	0	90.91	0	4	0	0	0	0	2	4	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	3	0	0	2	3
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	333.33	3	0	1	1	0	0	2	0	1	2	4
0	0	0	1	0	0	250.00	0	1	0	0	0	0	1	0	1	1	2
0	0	0	1	0	0	200.00	1	0	0	0	0	0	2	0	0	0	1
10	2	0	2	17	0	152.00	31	28	3	14	14	20	24	4	9	50	14

MONTHLY BULLETIN [illegible]

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
ADIRONDACK & NORTHERN DISTRICT TOTALS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MOHAWK VALLEY DIST. TOTALS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] TOTALS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MAY — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
....	2	....	3	4	1	60.00	24	44	3	20	10	14	35	12	18	42	28
0	0	0	0	0	0	......	1	3	0	0	1	0	1	1	0	1	0
0	0	0	0	0	0	......	1	1	0	2	0	1	0	0	0	1	0
0	0	0	0	1	0	333.33	0	1	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	1	1	0
0	0	0	0	0	0	......	0	4	0	1	0	0	1	0	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	4	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	1	62.50	5	2	0	1	1	0	0	1	1	2	2
0	0	0	0	0	0	100.00	1	3	0	0	0	0	2	0	1	0	2
0	0	0	0	0	0	......	3	1	1	1	0	0	3	0	0	0	1
0	1	0	0	0	0	90.91	1	0	1	0	0	2	0	1	1	1	3
0	0	0	0	0	0	......	0	4	0	2	0	2	1	3	2	5	2
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	1
0	1	0	3	3	0	75.00	12	24	1	13	8	8	22	7	12	28	13
2	7	3	3	14	5	110.75	32	48	6	20	13	37	51	13	18	58	32
0	0	0	0	0	2	83.33	1	3	0	0	1	3	6	1	0	0	7
0	0	0	0	0	0	......	0	1	0	0	1	0	1	1	0	1	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	0
0	1	0	0	4	0	166.00	3	2	0	4	0	3	8	0	1	4	1
0	0	0	0	0	0	......	1	0	1	1	0	0	0	0	1	1	0
0	1	0	0	5	0	200.00	1	2	0	1	0	4	12	0	1	1	2
0	0	0	0	2	0	200.00	2	0	0	0	0	2	0	1	1	3	3
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	2	3	1	1	1	0	0	0	1	0	0
1	0	0	2	0	2	80.06	7	9	3	2	1	10	9	3	7	4	3
0	0	0	0	0	0	......	1	1	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	95.23	1	5	0	3	0	1	4	1	1	2	1
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	......	0	2	1	0	0	0	0	0	0	2	0
0	0	1	1	0	0	571.42	0	1	0	0	0	2	0	0	0	0	0
0	0	0	0	0	0	......	0	1	0	1	0	0	0	0	0	0	0
1	2	0	0	0	0	210.50	0	5	0	1	3	1	3	1	0	1	0
0	3	1	0	2	1	82.25	10	13	0	5	6	11	8	5	5	37	14
2	1	2	1	2	4	56.40	30	37	4	21	10	22	29	14	19	32	33
0	0	0	0	0	0	22.22	4	5	1	5	3	7	5	3	3	1	7
0	0	0	0	0	0	......	1	1	0	1	1	0	0	0	0	2	0
0	0	0	0	0	0	......	0	1	1	1	0	0	1	0	0	1	0
0	1	0	0	0	0	500.00	0	0	0	0	0	1	0	0	0	0	0
0	0	0	0	2	1	107.14	2	6	0	1	3	2	5	0	1	0	5
1	0	0	0	0	0	333.33	0	0	0	0	0	1	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	2	0	0
0	0	0	0	0	0	......	3	1	0	2	0	0	2	1	2	1	1
0	0	0	0	0	0	......	1	0	0	1	0	0	1	0	0	1	0
0	0	0	0	0	0	......	2	2	0	2	0	2	0	0	1	1	4
0	0	1	0	0	0	72.00	2	2	0	1	1	1	4	0	0	0	1
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	1	0	0	0	1	0	0	0	2	0
1	0	1	1	0	3	64.52	14	18	2	7	2	6	9	10	10	23	15

MONTHLY BULLETINS FOR

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
EAST CENTRAL DIST.:										
Totals	....	336	......	58	17.2	4	....	5	3	....
Walton	3,540	5	17.00	1	20.0	1	0	0	0	0
Delhi	3,000	7	28.00	3	42.8	0	0	0	0	0
Cooperstown	*3,000	5	20.00	1	20.0	0	0	0	0	0
Oneonta	*7,000	9	15.43	2	22.2	0	0	0	0	0
Cazenovia	4,383	4	11.02	0	....	1	0	0	0	0
Brookfield	3,665	4	13.12	0	....	0	0	0	0	0
Norwich	5,500	11	24.00	6	54.5	0	0	0	0	0
Hamilton	3,912	4	12.30	0	....	0	0	0	0	0
SYRACUSE	*80,000	112	16.80	24	21.4	0	0	3	1	0
Cortland	*9,000	8	10.67	1	12.5	0	0	0	0	0
Homer	3,000	3	12.00	0	....	0	0	0	0	0
Rest of district	....	164	......	20	13.5	2	0	2	2	0
WEST CENTRAL DIST.:										
Totals	....	244	......	32	13.2	1	....	...	3	...
AUBURN	*26,000	37	17.08	5	13.5	1	0	0	1	0
ITHACA	*10,000	12	14.40	0	...	0	0	0	0	0
Waterloo	*4,500	6	[illegible]	0	....	0	0	0	0	0
[illegible]	[illegible]	1	......	0	....	0	0	0	0	0
Seneca Falls	*6,000	11	22.00	2	18.1	0	0	0	1	0
[illegible]	*4,[illegible]	3	[illegible]	1	33.3	0	0	0	0	0
[illegible]	*7,[illegible]	11	18.85	3	27.3	0	0	0	0	0
Canandaigua	*6,000	2	......	0	...	0	0	0	0	0
Geneva	*6,000	6	12.00	2	33.3	0	0	0	0	0
Penn Yan	*4,500	7	18.12	2	28.5	0	0	0	0	0
Batavia	7,000	3	......	0	....	0	0	0	0	0
Rest of district	....	143	......	17	11.8	0	0	0	1	0
LAKE ONTARIO AND WESTERN DIST.:										
Totals	....	747	......	206	27.6	6	....	9	4	....
Oswego	*24,000	26	13.00	5	19.2	0	0	0	1	0
[illegible]	4,000	5	15.00	0	....	0	0	0	0	0
Fulton	*4,000	3	9.00	0	....	0	0	0	0	0
Clyde	*3,000	2	8.00	1	50.0	0	0	0	0	0
Lyons	*6,000	9	18.00	3	33.3	0	0	0	0	0
Newark	3,500	5	17.15	0	....	0	0	0	0	0
Palmyra	*4,800	5	12.50	1	25.0	0	0	0	0	0
ROCHESTER	*110,000	151	16.48	40	24.1	0	0	0	0	0
Brockport	4,500	6	16.00	1	16.7	0	0	0	0	0
Medina	4,000	12	36.00	4	33.3	0	0	0	0	0
Albion	*5,000	9	21.60	0	....	0	0	0	0	0
LOCKPORT	*16,000	11	......	2	18.3	0	0	0	0	0
Niagara	7,500	15	24.00	3	20.0	0	0	0	0	0
BUFFALO	*230,000	†292	16.50	121	40.0	2	0	1	2	0
Tonawanda	5,000	10	24.00	1	10.0	1	0	0	0	0
Amherst	4,578	2	......	1	....	0	0	0	0	0
Rest of district	....	184	......	23	....	3	0	8	1	0
Totals for the State	....	8,357	......	2,773	33.2	42	....	63	37	....
Totals for April, 1888	....	9,032	......	2,891	30.0	62	2	59	68	42

*For four weeks

REMARKS.— The reported mortality for May is less than the average for the four preceding months of preceding four months but is a little higher than that of last year. There is a falling off in the a smaller proportion of deaths from diphtheria, 5.90 per cent of the total mortality being from this cause. is reported, for the first time since September, 1886; it is not known to exist in any locality in the State. for either of the preceding months of the year. From consumption there were 131.73 deaths in each 1,000

NOTE.— For boundaries of Sanitary

MAY — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
4	2	2	1	7	1	86.31	37	46	3	24	12	27	37	21	11	62	27
0	0	0	0	0	0	200.00	0	0	0	0	0	0	1	0	0	3	0
1	0	0	0	0	0	285.71	0	2	0	1	0	0	0	0	0	2	1
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	1	3
0	0	0	0	0	0	......	2	1	1	0	1	1	2	0	0	1	0
0	0	0	0	0	0	250.00	1	1	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	1	0	0	0	1	0	0	1	1	0	0
0	1	0	0	0	0	90.91	1	1	0	2	0	1	0	0	0	1	4
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	3	0
0	1	0	0	3	1	80.35	16	21	0	7	1	11	22	7	6	12	0
0	0	0	0	0	0	......	1	3	0	0	0	0	2	1	0	0	1
0	0	0	0	0	0	......	1	0	0	0	1	0	0	0	0	1	0
3	0	2	1	4	0	97.75	14	17	2	14	8	14	8	12	4	37	18
....	1	1	....	4	1	45.10	26	33	3	26	6	24	22	6	15	52	20
0	0	1	0	4	0	189.00	4	7	0	5	0	3	5	0	1	3	2
0	0	0	0	0	0	......	0	0	0	3	1	0	2	1	3	2	0
0	0	0	0	0	0	......	2	1	0	0	0	0	0	0	0	5	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	91.90	3	0	0	0	1	1	1	0	0	2	2
0	0	0	0	0	0	......	1	0	0	1	0	0	0	0	0	0	1
0	0	0	0	0	0	......	1	1	0	2	0	1	1	1	1	1	2
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	1	0
0	0	0	0	0	0	......	0	1	0	6	0	1	2	0	0	2	0
0	1	0	0	0	0	142.50	1	0	0	2	0	2	1	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	1	1	0	0	0	0
0	0	0	0	0	1	14.28	13	23	3	13	4	15	9	3	9	36	13
9	....	3	8	25	8	97.16	91	91	7	64	32	59	105	19	40	79	88
1	0	0	0	0	0	55.55	1	7	0	2	2	2	1	1	1	4	3
0	0	0	0	0	0	......	0	0	0	1	0	1	0	2	0	1	0
0	0	0	0	0	0	......	2	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	0	0	1	0	1	0	3	0	0	2	2
0	0	0	0	0	0	......	0	1	0	0	0	0	1	1	2	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	1	0	2	0	1
0	0	2	3	7	2	93.33	15	22	1	9	12	16	33	3	8	6	12
0	0	0	0	0	0	......	0	1	0	0	0	1	1	1	0	2	0
0	0	0	0	0	0	......	2	1	0	1	1	0	2	0	0	2	3
0	0	0	0	0	0	......	2	1	1	0	0	0	1	2	1	1	0
0	0	0	0	0	0	......	1	2	0	0	1	4	1	0	0	0	2
0	0	0	1	0	1	133.33	0	0	0	2	0	3	3	1	0	0	4
8	0	0	4	14	3	110.00	51	35	0	22	8	16	47	3	16	13	47
0	0	0	0	0	0	100.00	0	1	0	2	1	1	0	0	2	2	0
0	0	0	0	0	0	......	0	0	1	0	0	0	0	0	0	0	1
0	0	1	0	4	2	125.00	16	20	3	24	6	15	11	5	8	45	12
276	108	40	121	492	123	155.91	1,172	1,102	86	511	421	599	951	227	377	548	1061
277	109	50	49	627	131	150.00	1,438	1,195	98	458	481	570	1009	211	370	738	988

ending May 25.
the year, and less than that for May, 1888. The rate of infant mortality is also lower than for either of the
mortality for scarlet fever and measles, the prevalence of which has been previously noted. There is also
o nearly one per cent less than the proportion for the four preceding months. No death from small-pox
From all zymotic diseases there were 155.91 deaths in each 1,000 deaths from all causes, being lower than
deaths from all causes, and 197.13 per 1,000 deaths above the age of five years.
Districts see Annual Summary.

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

[Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of —	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT: Totals	....	5,674	......	2,972	52.5	14	....	28	42	....
NEW YORK CITY	*1,571,558	3,321	25.70	1,711	51.5	14	0	19	15	0
BROOKLYN	*821,525	1,787	26.46	1,045	58.5	0	0	7	21	0
Gravesend	*6,000	20	40.00	7	35.0	0	0	0	0	0
New Utrecht	*5,000	12	28.80	3	25.0	0	0	0	0	0
LONG ISLAND CITY	*40,000	88	26.40	49	55.7	0	0	1	2	0
Newtown	*10,000	43	51.60	21	50.5	0	0	0	0	0
Oyster Bay	*12,000	12	12.00	5	41.6	0	0	0	0	0
Hempstead	18,160	16	......	5	31.2	0	0	0	1	0
North Hempstead	8,000	12	18.00	4	33.3	0	0	0	0	0
Huntington	8,100	4	6.00	2	50.0	0	0	0	0	0
Southold	7,267	6	10.00	2	33.3	0	0	0	0	0
Sag Harbor	*3,600	2	8.00	1	50.0	0	0	0	0	0
New Brighton	*15,000	24	19.20	7	29.2	0	0	0	0	0
Edgewater	12,000	26	26.00	8	30.8	0	0	0	1	0
Port Richmond	*3,600	4	13.34	2	50.0	0	0	0	0	0
Westfield	7,000	6	10.28	0	....	0	0	0	0	0
YONKERS	*30,000	46	18.40	30	65.2	0	0	0	0	0
Westchester	*7,000	4	6.85	1	25.0	0	0	0	0	0
Portchester	*4,000	14	42.00	4	28.5	0	0	0	0	0
Sing Sing	*6,500	11	20.31	4	36.3	0	0	0	0	0
New Rochelle	*5,500	8	17.45	5	62.5	0	0	0	0	0
Peekskill	7,000	11	18.85	2	18.2	0	0	0	0	0
Rest of district	....	197	......	54	27.0	0	0	1	2	0
HUDSON VALLEY DIST.: Totals	....	819	......	242	29.5	....	....	7	8	....
ALBANY	*103,000	156	18.17	58	37.2	0	0	0	1	0
COHOES	*20,000	37	22.20	12	32.4	0	0	0	0	0
TROY	*65,000	109	20.12	45	41.3	0	0	3	0	0
West Troy	*13,000	16	14.77	6	37.5	0	0	0	0	0
Hoosick Falls	*6,000	11	22.00	4	36.4	0	0	0	0	0
Lansingburgh	*10,000	14	16.80	6	42.8	0	0	1	0	0
Green Island	*5,000	4	9.60	0	...	0	0	1	0	0
Greenbush	*8,000	9	13.50	2	22.2	0	0	0	0	0
Coxsackie	4,000	6	18.00	0	....	0	0	0	0	0
Catskill	*4,500	6	16.00	2	33.3	0	0	0	0	0
HUDSON	*10,000	8	9.60	3	37.5	0	0	0	0	0
KINGSTON	*21,000	34	19.43	14	41.2	0	0	0	2	0
Ellenville	3,000	4	16.00	0	....	0	0	0	0	0
Marbletown	4,000	4	12.00	0	....	0	0	0	1	0
Esopus	4,736	4	10.00	2	50.0	0	0	0	0	0
Saugerties	*4,000	5	15.00	2	40.0	0	0	0	0	0
POUGHKEEPSIE	*20,200	35	20.79	11	31.4	0	0	0	0	0
Fishkill	10,732	24	26.83	6	25.0	0	0	0	0	0
Wappinger Falls	*5,000	4	9 60	0	....	0	0	0	1	0
NEWBURGH	*20,000	30	18.00	13	43.3	0	0	0	1	0
Port Jervis	*9,500	10	12.63	1	10.0	0	0	0	0	0
MIDDLETOWN	*10,000	25	30.00	5	20.0	0	0	0	1	0
Goshen	4,387	8	21.82	1	12.5	0	0	0	0	0
Haverstraw	*7,000	14	24.00	7	50.0	0	0	0	0	0
Nyack	*5,000	6	14.40	0	....	0	0	0	0	0
Rest of district	....	236	......	42	17.6	0	0	2	1	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during June, 1889.

populations preceded by a star (*) are estimated to date ; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
108	43	13	92	313	1,008	293.00	537	593	49	447	268	262	612	111	204	102	828
69	29	8	53	206	568	292.47	336	376	26	259	171	144	301	72	130	31	494
19	11	5	29	84	361	300.50	172	158	22	153	74	85	231	25	45	26	259
0	0	0	0	2	6	400.00	0	1	0	1	2	1	2	0	4	1	0
0	1	0	0	1	1	250.00	0	0	0	1	1	0	1	0	4	0	2
3	0	0	0	14	23	498.40	5	3	0	3	4	2	7	1	6	2	12
2	0	0	0	2	9	302.32	3	8	0	2	0	1	4	1	0	1	10
0	0	0	0	0	0	......	0	2	0	0	1	1	5	0	0	2	1
0	0	0	0	0	1	125.00	0	1	0	0	2	0	4	2	1	2	2
2	0	0	0	0	1	333.33	0	0	0	2	1	1	3	0	0	1	1
0	0	0	0	0	0	......	2	2	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	166.67	0	0	0	0	0	2	0	0	1	1	1
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	0	1
0	0	0	1	0	1	83.33	2	3	0	0	1	4	4	0	0	3	5
0	0	0	0	1	1	115.38	1	3	0	1	1	3	6	3	1	1	3
0	0	0	1	0	0	125.00	0	1	0	0	0	0	0	0	1	0	1
0	0	0	0	0	1	166.67	1	0	0	2	0	0	0	0	1	1	0
2	0	0	0	0	20	478.26	3	4	0	1	1	0	7	2	0	1	5
0	0	0	0	0	0		0	0	0	0	0	2	1	0	0	1	0
5	0	0	2	0	0	500.00	0	0	0	1	0	1	1	1	2	1	0
0	0	0	0	0	0	......	0	4	0	2	0	1	1	0	0	2	1
2	0	0	0	0	1	375.00	0	0	0	1	0	0	2	0	1	0	1
0	0	0	0	0	1	91.90	1	2	0	1	0	0	1	1	0	2	2
4	2	0	6	2	13	150.00	11	25	1	17	9	13	31	3	7	23	27
29	14	....	6	55	49	204.90	52	87	6	61	39	73	92	23	60	75	82
7	4	0	0	17	10	250.00	9	17	2	15	9	21	20	2	5	15	2
0	0	0	0	2	3	135.18	5	4	0	6	2	2	6	0	2	2	3
6	3	0	0	2	17	284.40	14	11	0	5	5	10	13	1	4	2	13
1	0	0	0	1	1	187.50	1	1	0	0	2	1	3	1	1	0	3
0	0	0	0	7	0	636 36	0	0	1	0	0	1	2	0	0	0	0
0	0	0	0	0	1	142.85	0	1	0	0	0	0	3	1	1	1	5
0	0	0	0	0	1	500.00	0	1	0	0	1	0	0	0	0	0	0
1	0	0	0	1	0	222.22	0	1	0	0	0	1	0	0	3	1	1
0	0	0	0	0	0	......	1	0	0	0	0	1	0	0	0	3	1
0	0	0	0	0	0	......	1	2	0	0	1	0	0	0	0	0	2
1	0	0	0	0	0	125.00	0	0	0	0	1	2	1	1	0	1	1
0	2	0	0	3	5	571.43	3	3	0	5	1	4	1	0	1	3	1
0	0	0	0	0	0	...	0	1	0	0	0	0	0	1	2	0	0
0	0	0	0	0	0	250.00	0	0	0	0	0	0	0	1	0	1	1
0	1	0	0	1	0	500.00	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	0	....	2	0	0	0	0	2	1	0	0	0	0
1	0	0	0	2	3	171.42	3	5	0	2	4	6	3	1	2	0	3
1	0	0	0	0	3	166 67	0	5	0	2	1	2	1	0	5	1	3
0	0	0	0	0	0	250.00	0	0	0	0	0	0	0	0	1	1	1
0	2	0	0	2	2	233.33	1	4	1	3	2	3	2	0	1	1	5
1	0	0	0	0	0	100.00	0	2	0	0	1	0	0	0	3	1	2
4	0	0	0	0	0	200.00	2	2	0	2	0	2	4	0	2	4	2
0	0	0	0	4	0	500.00	0	1	0	0	0	0	2	0	0	0	1
1	0	0	0	1	1	214.28	0	1	0	0	3	1	1	0	3	1	1
0	0	0	0	0	0	......	0	0	0	1	0	1	2	0	1	1	0
5	2	0	6	12	2	127.10	10	25	2	20	6	13	27	14	23	36	30

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
ADIRONDACK & NORTHERN DISTRICT:										
Totals	....	214	......	60	28.5	....	....	1	....	....
Greenwich	3,861	4	12.45	0	....	0	0	0	0	0
Salem	3,500	1	......	0	....	0	0	0	0	0
Fort Edward	4,880	1	......	0	....	0	0	0	0	0
Crown Point	4,287	2	6.00	0	....	0	0	0	0	0
Port Henry	3,000	6	24.00	6	100.0	0	0	0	0	0
Malone	*9,000	6	8.00	4	66.6	0	0	0	0	0
Potsdam	*4,000	4	12.00	2	50.0	0	0	0	0	0
OGDENSBURGH	*11,000	15	16.36	0	....	0	0	0	0	0
Gouverneur	*5,500	3	6.55	1	33.3	0	0	0	0	0
Ellisburgh	4,811	1	......	0	....	0	0	0	0	0
Plattsburgh	*7,000	12	20.57	7	58.3	0	0	0	0	0
WATERTOWN	*12,200	10	10.00	6	60.0	0	0	0	0	0
Cape Vincent	3,143	1	......	0	....	0	0	0	0	0
Clayton	4,314	1	......	1	100.0	0	0	0	0	0
Rest of district	....	147	......	33	22.2	0	0	1	0	0
MOHAWK VALLEY DIST.:										
Totals	....	309	......	70	23.0	6	....	1	2	...
SCHENECTADY	*20,000	22	13.20	9	40.9	1	0	0	0	0
Schoharie	3,350	1	......	0	....	0	0	0	0	0
Cobleskill	3,371	9	32.40	1	11.1	0	0	0	0	0
Middleburgh	3,376	2	......	1	50.0	0	0	0	0	0
AMSTERDAM	*20,000	24	13.40	13	54.2	1	0	0	0	0
Johnstown	*6,000	7	14.00	0	....	0	0	0	0	0
Gloversville	*10,000	15	18.20	3	20.0	0	0	0	0	0
Little Falls	7,200	8	13.33	1	12.5	0	0	0	0	0
Herkimer	3,000	5	20.00	1	20.0	0	0	0	0	0
Ilion	*4,200	5	14.30	0	....	0	0	0	0	0
UTICA	*50,000	45	10.80	10	22.2	2	0	0	1	0
ROME	12,045	14	14.00	1	7.1	0	0	0	0	0
Boonville	*4,000	7	21.00	1	14.3	0	0	0	0	0
Camden	3,400	3	10.60	0	....	0	0	0	0	0
Waterford	*5,400	13	28.88	4	30.7	0	0	0	0	0
Ballston Spa	3,200	6	22.50	3	50.0	0	0	0	0	0
Saratoga Springs	*10,000	20	24.00	6	30.0	0	0	0	1	0
Rest of district	....	103	......	16	15.7	2	0	1	0	0
SOUTHERN TIER DIST.:										
Totals	....	204	......	41	20.0	1	....	2	1	....
BINGHAMTON	*30,000	25	10.00	9	36.0	0	0	0	0	0
Owego	*6,000	4	8.00	0	....	0	0	0	0	0
Candor	4,323	3	8.00	1	33.3	0	0	0	0	0
Waverly	*3,000	5	20.00	0	....	0	0	0	0	0
ELMIRA	*25,000	25	12.00	7	28.0	0	0	0	0	0
Horseheads	3,500	5	17.14	1	20.0	0	0	0	0	0
Bath	3,500	4	13.71	0	....	0	0	0	0	0
Olean	*8,000	7	10.50	3	42.8	0	0	0	0	0
Salamanca	*6,000	7	14.00	5	71.8	0	0	0	0	0
JAMESTOWN	*14,000	8	......	0	....	0	0	0	0	0
Westfield	3,000	2	8.00	0	....	0	0	1	0	0
Fredonia	*3,000	6	24.00	3	50.0	0	0	0	0	0
Rest of district	....	103	......	12	12.0	1	0	1	1	0
EAST CENTRAL DIST.:										
Totals	....	294	......	46	15.5	1	....	2	1	....
Walton	3,540	2	7.00	0	....	0	0	0	0	0
Delhi	3,000	1	4.00	0	....	0	0	0	0	0

JUNE — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
1	3	....	5	6	9	119.00	19	33	3	10	6	21	28	7	11	24	27
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	2	0	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	1	0	0	1	0	0	0
0	0	0	0	1	1	333.33	0	0	0	1	0	0	1	0	0	0	2
0	0	0	0	1	0	166.67	0	0	0	0	0	1	0	0	1	1	2
0	0	0	0	0	1	250.00	0	1	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	2	3	0	1	1	2	3	0	0	0	3
0	0	0	0	0	0	......	1	0	0	0	0	1	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	0	0
0	1	0	0	1	1	250 00	3	3	0	0	0	0	3	0	0	0	0
0	0	0	2	0	0	200.00	0	2	0	0	0	0	3	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	0	0
1	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	0
0	2	0	3	3	6	100.00	13	21	3	8	4	15	15	6	8	21	18
2	2	3	1	7	11	116.50	23	39	1	23	14	16	39	19	12	51	37
0	1	0	0	0	2	136.36	3	4	0	1	0	2	2	0	2	0	4
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	1	1	0	0	1	1	2	0	0	2	1
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	0	1
0	0	0	0	3	2	250.00	3	3	0	0	0	1	4	3	0	1	3
0	0	0	0	0	0	......	1	3	0	0	0	0	1	0	0	1	1
0	0	0	0	1	0	66.67	1	0	0	0	1	2	7	1	0	1	1
0	0	0	0	0	0	......	0	0	0	0	1	1	3	0	1	2	0
0	0	0	0	0	0	......	1	1	0	0	0	0	1	1	0	1	0
0	0	0	0	0	0	......	0	1	0	1	2	0	0	0	0	0	1
0	0	0	1	0	1	111.11	4	5	1	4	2	4	5	5	3	3	4
0	0	2	0	0	0	142.85	1	2	0	0	1	2	2	1	0	2	1
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	0	4	1
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	1	1	0
0	1	0	0	0	2	230.77	1	3	0	1	0	0	1	0	1	1	2
0	0	0	0	0	0	......	0	2	0	1	0	0	0	1	1	0	1
0	0	0	0	0	4	250.00	0	3	0	3	2	0	1	0	1	2	3
2	0	1	0	3	0	90.00	7	9	0	12	4	2	9	7	2	30	12
4	....	1	2	2	6	95.00	12	23	4	12	5	20	27	13	12	30	27
0	0	0	0	0	3	120.00	2	3	2	0	0	2	5	3	0	1	4
0	0	0	0	0	0	......	0	0	0	1	0	0	0	1	1	1	0
0	0	0	0	0	0	......	0	0	0	0	0	1	1	1	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	1	0	3	0
0	0	1	0	0	2	120.00	3	4	0	0	1	2	4	1	1	0	6
3	0	0	0	0	0	600.00	0	0	0	0	0	0	0	0	0	2	0
0	0	0	0	0	0	......	0	0	1	1	0	0	0	0	0	1	1
0	0	0	0	0	1	142.85	0	2	0	0	0	0	0	2	0	0	2
0	0	0	1	0	0	142.85	1	0	0	1	0	0	1	0	0	0	3
0	0	0	0	0	0	......	1	2	0	0	0	1	1	1	1	0	1
0	0	0	0	0	0	500.00	0	0	0	1	0	0	0	0	0	0	0
0	0	0	1	0	0	166.67	0	1	0	0	0	0	1	0	0	2	1
1	0	0	0	2	0	60.00	5	11	1	8	4	13	14	3	9	20	9
6	1	1	3	9	6	98.50	30	37	5	17	17	27	42	19	11	45	14
0	0	0	0	0	0	......	0	0	0	1	0	1	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	0	0

MONTHLY BULLETIN FOR

JUNE — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	0	1	0	0	0	4	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	0	0	2	0	0	0	1	0	1	0
0	0	0	0	0	0	......	1	0	0	0	0	3	0	1	0	2	1
0	1	0	0	1	0	222.22	1	2	0	0	1	1	0	1	0	1	0
0	0	0	3	0	0	375.00	1	0	0	0	0	0	1	0	0	2	2
3	0	0	0	5	3	134.00	9	18	3	5	7	10	15	5	6	6	0
0	0	0	0	0	0	......	2	2	0	0	1	2	2	0	0	2	0
1	0	0	0	0	0	333.33	0	0	0	0	0	0	0	1	0	1	0
2	0	1	0	3	3	78.60	16	15	1	9	7	10	18	10	5	28	11
1	....	1	....	6	3	72.00	12	26	2	12	10	13	25	10	11	42	16
0	0	0	0	1	1	103.38	1	5	0	3	1	1	6	2	1	3	3
0	0	0	0	4	0	400.00	0	0	1	1	0	2	0	1	0	2	0
0	0	0	0	0	0	......	0	0	0	0	2	0	0	1	0	1	1
0	0	0	0	0	0	....	0	3	0	0	0	0	1	0	0	1	0
1	0	0	0	0	1	285.71	0	0	0	1	0	1	1	0	1	1	0
0	0	0	0	0	0	......	1	1	0	0	0	0	0	2	0	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	1	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	1	0	0	0	1	1	2	0	0	2	1
0	0	0	0	0	0	......	0	2	0	1	0	0	0	0	0	4	1
0	0	0	0	0	0	......	1	1	0	1	0	0	0	0	0	0	0
0	0	1	0	1	1	37.00	7	14	1	4	6	8	14	4	9	27	10
3	1	1	11	25	20	107.80	59	81	7	57	27	53	86	20	55	45	102
0	0	0	0	0	0	......	0	2	0	0	1	3	4	1	2	2	2
0	0	0	0	1	0	250.00	0	0	0	0	0	0	0	0	0	1	2
0	0	0	0	1	0	500.00	1	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	1	400.00	1	0	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	......	1	0	0	1	0	0	0	0	0	1	1
0	0	0	0	0	0	......	2	1	0	0	0	0	0	0	0	0	0
0	1	0	5	2	5	......	11	17	2	10	6	9	24	2	9	10	13
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	1	1	2
0	0	0	0	0	0	......	0	1	0	0	0	0	1	1	0	2	1
0	0	0	0	0	0	......	2	0	0	1	0	5	1	1	1	0	0
0	0	0	0	0	0	......	0	2	0	0	0	1	2	0	2	1	3
3	0	0	5	18	1	130.55	36	31	3	27	13	23	41	9	27	2	61
0	0	0	0	0	1	125.00	1	0	0	0	0	0	1	0	3	0	2
0	0	0	0	0	0	......	0	1	1	2	0	2	0	0	0	1	0
0	0	0	1	3	2	80.20	4	25	1	16	6	9	12	6	10	24	13
154	64	20	120	423	1112	241.82	744	919	77	639	386	485	951	222	376	414	1133
233	130	25	61	490	811	227.34	778	868	94	516	393	491	1075	237	411	472	1130

ending June 29.

the same as that of June, 1888. The infant mortality is, however, much increased. This is evidently due of the corresponding month for the past five years, and is nearly ten times greater than that of May. all other causes, including those from zymotic diseases except diarrhœal, are less than in May; the mor- since last year, being markedly diminished. No deaths from small-pox occurred, but a case of small-pox originated in Colorado, have been reported. In each 1,000 deaths there were 109.80 from consumption; and Districts, see Annual Summary.

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

Cities are printed in SMALL CAPITALS, villages in italics, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small pox.
MARITIME DISTRICT:										
Totals	....	7,1[illegible]	......	4,1[illegible]	5[illegible].5	[illegible]	....	[illegible]	[illegible]	....
NEW YORK CITY	*1,5[illegible]1,[illegible]	4,[illegible]	32.46	2,[illegible]	5[illegible].[illegible]	18	[illegible]	[illegible]	15	0
BROOKLYN	*[illegible]21,[illegible]	1,[illegible]	[illegible]	1,17[illegible]	[illegible].3	0	6	15	19	0
Gravesend	*[illegible],000	[illegible]	......	17	[illegible].4	6	0	1	0	0
New Utrecht	*5,000	[illegible]	......	17	65.4	0	0	0	0	0
LONG ISLAND CITY	*[illegible],000	9[illegible]	25.10	5[illegible]	50.[illegible]	0	0	0	1	0
Flatbush	*[illegible],000	33	45.75	20	6[illegible].[illegible]	0	0	0	0	0
Newtown	*1[illegible],000	46	55.2[illegible]	21	45.6	0	0	2	0	0
Oyster Bay	*12,000	17	......	7	....	0	0	0	0	0
Hempstead	15,160	31	[illegible].50	19	62.5	0	0	0	1	0
North Hempstead	8,000	15	22.50	9	60.0	0	0	0	0	0
Huntington	8,100	20	29.63	9	45.0	0	0	0	0	0
Southold	7,[illegible]	5	[illegible].50	3	60.0	0	0	0	0	0
Sag Harbor	*3,000	6	24.[illegible]	4	66.7	0	0	0	0	0
New Brighton	*1[illegible],000	3[illegible]	[illegible]	22	57.4	0	0	0	0	0
Port Richmond	*[illegible],600	14	46.6[illegible]	6	42.[illegible]	0	0	0	0	0
Westfield	7,000	1[illegible]	30.[illegible]	12	66.6	0	0	0	1	0
YONKERS	*[illegible],000	66	26.4[illegible]	31	47.0	0	0	1	1	0
Westchester	*7,000	1[illegible]	29.14	[illegible]	47.0	1	0	0	0	0
Portchester	*4,000	[illegible]	24.00	6	75.0	0	0	0	0	0
Sing Sing	*6,500	24	44 44	8	33.3	0	0	0	0	0
New Rochelle	*5,500	15	32.72	9	60.0	0	0	0	0	0
Peekskill	7,000	14	24.[illegible]	[illegible]	57.1	0	0	0	0	0
Rest of district	....	[illegible]	......	1[illegible]2	44 0	1	0	3	2	0
HUDSON VALLEY DIST.:										
Totals	....	1,175	......	540	45 0	9	....	23	[illegible]	....
ALBANY	*1[illegible],000	223	25.9[illegible]	1[illegible]1	45.3	0	0	3	0	0
COHOES	*20,000	54	32.4[illegible]	29	[illegible].7	1	0	1	0	0
TROY	*65,000	[illegible]227	41.[illegible]0	1[illegible]	52.[illegible]	2	0	7	0	0
West Troy	*13,000	35	32.30	1[illegible]	42.9	0	0	0	0	0
Hoosick Falls	*[illegible],000	12	24.00	5	41.7	0	0	0	0	0
Lansingburgh	*10,000	20	24.00	12	60.0	0	0	0	0	0
Green Island	*5,000	9	21.60	[illegible]	[illegible].8	1	0	0	0	0
Greenbush	*8,000	11	16.50	4	36.4	0	0	1	0	0
Coxsackie	4,000	7	21.00	2	2[illegible].5	0	0	0	0	0
Catskill	*4,500	[illegible]	24.00	3	33.3	0	0	0	0	0
HUDSON	*10,000	35	42.00	14	40.0	0	0	0	2	0
KINGSTON	*21,000	50	28.56	20	40.0	1	0	0	2	0
Ellenville	3,000	4	16.00	1	25.0	0	0	0	0	0
Esopus	4,736	6	15.20	5	83.3	1	0	0	0	0
Saugerties	*4,000	12	36.00	8	66.6	0	0	0	0	0
POUGHKEEPSIE	*20,200	39	23.16	18	46.3	1	0	0	0	0
Fishkill	10,732	20	31.30	19	67.8	1	0	0	0	0
Wappinger Falls	*5,000	5	12.00	5	100.0	0	0	0	0	0
NEWBURGH	*20,000	43	25.80	22	48.8	0	0	0	1	0
Port Jervis	*9,500	16	20.21	6	37.5	0	0	2	0	0
MIDDLETOWN	*10,000	22	26.40	10	45.5	0	0	0	0	0
Goshen	4,387	8	21.88	0	....	0	0	0	0	0
Haverstraw	*7,000	28	48.00	16	44.5	0	0	0	1	0
Nyack	*5,000	3	7.20	2	66.6	0	0	0	0	0
Ramapo	*5,000	8	19.20	5	62.5	0	0	0	0	0
Rest of district	....	261	......	90	34.6	1	0	9	2	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during July, 1889.

population preceded by a star (*) are estimated to date; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
45	24	9	85	225	2,204	386.00	393	656	37	570	329	291	624	111	184	141	1084
30	18	5	57	136	1,425	400.60	246	421	23	360	214	160	322	76	108	51	617
10	4	3	25	73	492	333.18	110	164	13	153	81	79	218	27	55	31	382
0	0	0	0	0	14	344.00	1	1	0	0	3	0	2	1	1	0	2
0	0	0	0	0	11	423.10	0	0	0	0	0	3	3	0	2	2	5
1	0	0	0	6	29	381.45	5	9	0	6	0	3	11	1	4	5	16
0	0	0	0	0	16	495.00	3	4	1	4	1	4	0	0	0	0	0
0	0	0	0	3	16	456.00	2	2	0	3	0	1	4	0	1	3	10
0	0	0	0	0	2	......	1	1	0	2	0	3	4	0	0	2	2
1	0	0	0	2	10	465.70	2	0	0	4	1	0	2	0	1	2	5
0	0	0	0	0	5	333.33	0	1	0	2	2	1	2	0	1	1	0
0	0	0	0	1	6	350.00	2	2	0	0	1	3	2	1	0	1	1
0	0	0	0	0	1	200.00	0	0	0	0	0	1	0	0	0	1	2
0	1	0	0	0	1	333.33	0	1	0	1	0	0	1	0	0	0	1
0	1	0	1	1	16	487.10	1	3	0	3	2	1	2	0	2	1	5
0	0	0	0	0	4	285.72	0	2	0	0	0	1	3	0	1	2	1
0	0	0	0	0	6	388.88	1	0	0	1	0	1	4	0	0	2	2
0	0	0	0	0	31	515.15	6	7	0	2	3	3	6	0	2	3	1
0	0	0	0	0	8	529.40	0	2	0	2	0	0	1	0	0	3	1
1	0	0	0	0	3	500.00	0	1	0	0	0	0	1	1	0	0	1
0	0	1	0	1	0	83.33	1	5	0	2	1	3	4	0	1	3	2
0	0	0	1	0	7	533.33	0	0	0	0	0	3	2	0	1	1	0
0	0	0	0	0	6	428.51	0	1	0	2	1	1	2	1	0	0	0
2	0	0	1	2	95	335.33	12	29	0	23	19	20	28	3	4	28	28
15	4	1	5	41	312	348.00	55	106	8	81	38	91	103	31	45	100	99
4	1	0	1	16	38	287.00	16	26	1	16	9	36	26	4	8	14	4
1	0	0	0	2	12	314.80	3	6	0	1	0	2	8	0	1	3	13
4	1	1	0	1	92	475.50	10	16	1	20	5	9	16	5	7	14	16
0	1	0	0	0	11	342.90	2	4	0	1	1	2	3	0	3	3	4
0	0	0	0	1	5	500.00	2	2	0	0	1	0	0	0	0	0	1
0	0	0	0	1	6	350.00	1	1	0	2	2	0	2	0	0	1	4
0	0	0	0	0	4	555.55	0	0	0	2	0	0	0	0	0	0	2
1	0	0	0	1	0	272.72	1	0	0	1	1	1	0	0	2	0	2
0	0	0	0	0	3	428.57	2	2	0	0	0	0	0	0	0	0	6
0	0	0	0	0	1	111.11	0	4	0	0	0	2	1	0	1	0	0
0	0	0	0	2	9	371.50	2	3	1	2	2	3	5	0	1	3	0
0	0	0	0	2	13	360.00	2	4	2	3	3	5	5	0	3	5	0
0	0	0	0	0	1	250.00	0	1	0	0	0	1	0	0	0	1	0
0	0	0	0	1	2	666.66	0	0	0	0	0	0	1	0	0	0	1
0	1	0	0	1	3	416.67	2	0	0	1	0	0	1	0	0	2	1
1	0	0	0	1	14	435.65	1	3	0	4	0	0	3	4	1	2	4
1	0	0	0	0	13	535.70	0	0	0	0	2	1	3	0	4	2	1
1	0	0	0	0	1	400 00	1	0	0	0	0	0	0	0	0	0	2
0	0	0	0	1	12	325.56	3	3	1	5	2	1	6	0	0	6	2
0	0	0	0	0	3	312.80	0	2	0	0	1	1	0	0	1	0	6
1	0	0	0	0	8	409.00	0	2	1	0	0	0	2	2	2	4	0
0	0	0	0	0	1	125.00	0	1	0	2	1	1	0	0	0	2	0
0	0	0	0	3	7	372.73	0	2	1	1	0	0	0	2	3	2	6
0	0	0	0	0	2	666.66	0	1	0	0	0	0	0	0	0	0	0
0	0	0	1	1	3	625.00	0	0	0	0	0	1	0	0	0	1	1
1	0	0	3	7	48	273.40	7	23	0	20	8	25	21	14	8	35	29

MONTHLY BULLETINS FOR

	Population.	Total number of deaths.	Representing annual death rate per 1,000.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
[illegible] DISTRICT. TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] VALLEY DIST. TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] DIST. TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EAST CENTRAL DIST. TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

JULY — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
....	1	....	3	4	38	221.60	7	29	1	28	8	17	25	12	13	25	15
0	0	0	0	0	0	....	0	0	0	0	0	0	0	1	0	0	1
0	0	0	0	0	1	142.85	0	1	0	0	0	0	1	0	1	2	1
0	0	0	0	0	0	....	0	0	0	1	0	0	0	0	0	2	0
0	0	0	0	0	1	250.00	0	0	0	2	0	0	0	0	0	1	0
0	0	0	0	0	1	500.00	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	....	0	0	0	1	1	1	0	1	0	1	1
0	0	0	0	0	0	....	3	1	0	0	0	0	1	0	1	0	0
0	0	0	0	0	1	117.50	0	3	0	0	0	2	2	3	2	2	1
0	0	0	0	0	2	375.00	1	3	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	....	0	1	0	1	0	1	1	0	0	0	0
0	0	0	0	0	5	333.33	0	0	0	0	0	3	5	0	2	0	0
0	0	0	1	0	2	200.00	0	5	1	1	0	1	0	0	1	0	3
0	0	0	0	0	0	....	0	0	0	0	1	2	0	0	0	2	0
0	0	0	0	0	0	....	0	0	0	0	0	0	0	1	0	2	0
0	1	0	2	4	25	261.00	3	15	0	22	6	7	14	5	6	13	8
2	3	2	1	5	96	256.00	20	54	1	22	22	30	46	19	15	49	36
0	0	1	0	0	8	312.50	2	2	0	0	2	4	2	0	2	1	7
0	0	0	0	0	0	....	0	2	0	0	0	0	0	0	1	0	1
0	0	0	0	2	9	387.10	0	6	0	0	0	0	5	4	1	0	3
0	0	0	0	1	2	272.72	0	1	0	0	2	0	0	0	4	1	0
0	3	0	0	0	7	416.66	1	1	0	0	2	2	3	1	0	1	3
0	0	0	0	0	5	294.10	1	2	0	0	0	1	3	2	0	2	1
0	0	0	0	0	2	600.00	0	0	0	1	0	0	0	0	0	1	0
0	0	0	0	0	0	....	0	0	0	0	0	0	0	0	0	1	1
1	0	0	0	0	31	365.55	6	12	0	4	5	4	10	2	2	10	4
0	0	0	0	2	2	160.00	0	4	0	2	2	1	4	2	0	3	3
0	0	0	1	0	1	500.00	0	1	0	0	0	0	0	0	0	1	1
0	0	0	0	0	1	142.85	1	1	0	0	0	0	1	0	1	1	1
0	0	0	0	0	6	500.00	0	3	0	0	0	2	0	0	1	0	0
0	0	0	0	0	1	500.00	0	0	0	0	0	0	2	0	0	0	0
0	0	0	0	0	8	333.33	0	5	0	2	1	1	2	1	0	5	1
1	0	1	0	0	13	150.00	9	14	1	13	8	15	14	7	3	22	10
.....	....	....	3	3	45	228.00	8	18	1	19	13	17	36	18	18	39	22
0	0	0	0	0	22	480.90	1	2	0	2	0	2	4	4	5	5	2
0	0	0	0	0	0	....	1	0	0	0	0	0	0	0	0	1	0
0	0	0	0	1	0	333.33	0	0	0	0	0	0	0	0	0	2	0
0	0	0	0	0	0	....	0	0	0	0	1	0	0	1	0	0	1
0	0	0	0	1	13	340.42	1	3	0	4	3	3	10	1	2	0	4
0	0	0	0	0	1	250.00	0	0	0	1	0	0	0	0	0	1	1
0	0	0	0	0	0	....	0	2	0	0	0	0	0	0	1	0	0
0	0	0	0	0	2	200.00	0	0	0	0	0	2	2	1	0	3	0
0	0	0	0	0	1	142.85	0	1	0	1	0	1	0	1	1	0	1
0	0	0	0	0	0	125.00	1	1	0	1	1	1	2	0	0	0	0
0	0	0	0	0	0	....	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	....	1	0	0	0	0	0	0	0	0	0	0
0	0	0	3	1	6	123.00	3	9	1	10	8	8	18	10	9	27	12
4	....	1	3	8	118	340.50	9	32	11	37	16	28	50	11	13	47	23
0	0	0	0	0	1	333.33	0	0	0	1	0	0	1	0	0	0	0
0	0	0	0	0	2	214.15	0	2	0	2	1	2	0	0	0	1	3

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
EAST CENT. DIST.—(*Cont.*):										
Worcester	*3,000	1	......	0	...	0	0	0	0	0
Cazenovia	4,363	8	21.80	2	25.0	0	0	0	0	0
Brookfield	3,685	1	......	0	....	0	0	0	0	0
Norwich	5,500	4	......	2	50.0	0	0	0	0	0
Hamilton	3,912	3	9.30	1	33.3	0	0	0	0	0
Oneida	*5,000	10	24.00	3	30.0	0	0	0	0	0
Baldwinsville	3,000	4	16.00	1	25.0	0	0	0	1	0
SYRACUSE	*80,000	200	30 00	85	42.5	0	0	0	3	0
Cortland	*9,000	6	8.00	2	33.3	0	0	1	0	0
Homer	3,000	5	20.00	1	20.0	0	0	0	0	0
Rest of district	....	161	......†	37	23.1	1	0	1	1	0
WEST CENTRAL DIST.: Totals	....	284	......	54	18.3	....	....	6	....	....
AUBURN	*26,000	49	22.61	17	34.7	0	0	1	0	0
ITHACA	*10,000	13	15.60	2	15.3	0	0	0	0	0
Waterloo	*4,500	2	......	1	50.0	0	0	0	0	0
Hector	*5,000	3	......	0	....	0	0	0	0	0
Seneca Falls	*6,000	12	24.00	6	50.0	0	0	0	0	0
Manchester	*4,000	4	12.00	0	....	0	0	0	0	0
Phelps	*7,000	3	......	0	....	0	0	0	0	0
Canandaigua	*6,300	8	15.40	1	12.5	0	0	0	0	0
Geneva	*6,000	10	20.00	2	20.0	0	0	0	0	0
Penn Yan	*4,500	6	16.00	1	16.7	0	0	0	0	0
Batavia	7,000	6	10.30	2	33.3	0	0	0	0	0
Le Roy	*5,000	2	......	0	....	0	0	0	0	0
Rest of district	....	166	......	21	11.6	0	0	5	0	0
LAKE ONT. AND WESTERN DISTRICT: Totals	....	863	......	437	50.6	11	....	11	4	1
OSWEGO	*24,000	22	11.00	5	22.7	0	0	0	0	0
Richland	4,000	2	6.00	0	....	0	0	0	0	0
Clyde	*3,000	1	......	0	....	0	0	0	0	0
Lyons	*6,000	4	8.00	0	....	0	0	0	0	0
Newark	3,500	2	......	0	....	0	0	0	0	0
Palmyra	*4,800	5	12.50	2	40.0	1	0	0	0	0
ROCHESTER	*110,000	264	28.80	151	57.2	0	0	5	0	0
Brockport	4,500	1	......	0	....	0	0	0	0	0
Medina	4,000	5	15.00	0	....	0	0	0	0	0
Albion	*5,000	8	18.00	3	37.5	1	0	0	0	0
LOCKPORT	*15,000	11	......	1	9.1	0	0	0	0	0
Niagara	7,500	9	14.44	6	33.3	0	0	1	0	0
BUFFALO	*230,000	‡390	19.22	233	59.7	9	0	4	1	1
Tonawanda	5,000	7	16.80	3	42.8	0	0	0	0	0
Amherst	4,578	1	......	0	....	0	0	0	0	0
Rest of district	....	131	......	33	25.4	0	0	1	3	0
Totals for the State	....	10,806	......	5,563	51.4	46	....	117	61	1
Totals for June, 1888	....	10,300	......	5,363	52.0	35	....	73	51	2

† Three non-residents. ‡ Thirty-one in public

REMARKS.—July is always the month of greatest mortality in this State. Of 368,000 deaths occurring that have been reported during the seven months of this year 10,650 occurred in this month. This increase cent of the mortality from this cause has occurred in July. The infant death rate has corresponded. Dur have been infantile. During the present month 51.4 per cent of the deaths are infantile, and about 28.5 for July. Scarlet fever, measles and whooping cough show considerably less fatality than a year ago. last bulletin, and three cases have developed. From consumption 93.22 deaths occurred in each 1,000 deaths in the maritime district, is much increased by a large transient summer population.

JULY — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	125.00	2	0	0	1	0	0	1	0	0	3	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	1	1	500.00	0	0	0	0	1	0	0	4	0	1	0
0	0	0	1	0	0	333.33	0	1	0	1	0	0	0	0	0	0	0
0	0	0	0	0	2	200.00	0	1	0	0	0	0	0	0	2	3	2
0	0	0	0	1	0	500.00	0	1	0	0	0	1	0	0	0	0	0
2	0	1	0	5	90	500.00	3	14	8	15	4	9	31	5	6	4	0
0	0	0	0	0	1	333.33	0	1	0	0	0	0	1	0	0	1	1
0	0	0	0	0	0	......	0	1	0	0	0	1	1	0	0	1	1
2	0	0	2	1	20	175.00	4	10	3	17	10	15	15	6	5	32	16
1	....	1	1	7	36	170.80	11	33	....	19	11	16	36	9	16	51	30
0	0	0	0	5	10	326.50	2	7	0	0	4	3	11	0	1	2	3
0	0	0	0	2	3	384.50	2	0	0	1	1	1	0	0	0	3	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	1	0	0	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	2	0	0
1	0	0	0	0	5	600.00	0	1	0	0	0	2	0	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	0	1	0	1	2	0	0
0	0	0	0	0	0	......	0	1	0	1	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	1	1	0	1	1	0	1	3
0	0	0	0	0	1	100.00	1	2	0	0	0	1	2	0	1	2	0
0	0	1	0	0	1	333.33	0	1	0	1	0	0	1	0	0	1	0
0	0	0	0	0	0	......	1	1	0	0	0	0	1	0	0	3	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	1	0	0
0	0	0	1	0	16	107.70	5	19	0	14	5	8	18	6	9	38	22
2	1	....	11	12	243	343.00	34	84	4	68	12	52	109	16	53	50	85
0	0	0	0	0	2	90.91	1	3	0	2	0	3	4	2	2	1	2
0	0	0	0	1	0	500.00	0	0	0	.0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	2	0	1
0	0	0	0	0	0	......	0	1	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	200.00	0	0	0	0	0	1	2	1	0	0	0
0	0	0	1	3	100	412.80	9	20	1	13	4	12	38	6	9	24	19
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	2	0	0	0	0	1	1	1	0	0
0	0	0	0	0	2	375.00	0	2	0	1	0	1	0	0	0	0	1
0	0	0	0	0	1	91.90	3	0	0	2	0	2	1	0	1	1	0
0	0	0	0	0	4	555.55	1	0	0	0	0	0	2	0	0	0	1
1	1	0	8	8	119	371.80	13	41	1	37	5	12	49	0	25	0	55
0	0	0	0	0	2	285.71	2	0	0	0	0	0	0	0	2	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	0	0
1	0	0	2	0	13	254.00	4	15	2	12	3	20	11	6	10	22	6
69	33	14	112	305	3,092	352.20	537	1,012	63	844	449	542	1,029	227	357	502	1,394
141	111	23	108	411	2,957	380,00	588	966	73	784	383	492	930	210	397	454	1,111

institutions. § For four weeks ending July 27.

during the last four years, more than 40,000, or about 11 per cent occurred in July, and of the 62,700 deaths is due to the excess of diarrhœal diseases over that of any other month. During the past four years 38 per ing four years 37 per cent of the deaths have occurred under five years of age; 53 per cent of the July deaths from diarrhœal diseases. There is rather a marked increase of deaths from typhoid fever over the average Small-pox has been brought to Albany, contracted from the traveling case from Colorada spoken of in the from all causes, and 190.40 per 1,000 over five years of age. The mortality of several localities, particularly

NOTE.—For boundaries of Sanitary Districts see Annual Summary.

MONTHLY BULLETIN OF THE N

Abstract of reports of deaths and their causes in th

Cities are printed in SMALL CAPITALS, villages in italics, and towns in Roman type. Th

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT:										
Totals	....	5,516	......	2,023	47.6	12	....	[illegible]	60	....
NEW YORK CITY	*1,571,55[illegible]	3,55[illegible]	24.65	1,593	47.4	10	0	71	35	[illegible]
BROOKLYN	*821,525	1,5[illegible]5	21.56	776	51.5	0	0	22	21	[illegible]
Gravesend	*6,000	22	44.00	13	59.9	0	0	0	0	[illegible]
New Utrecht	*5,000	15	36.00	4	26.7	0	0	0	0	[illegible]
LONG ISLAND CITY	*21,000	54	30.85	26	48.1	0	0	0	0	[illegible]
Flatbush	*[illegible]	15	23.25	4	26.6	0	0	1	0	[illegible]
Newtown	*10,000	25	30.00	13	52.0	0	0	0	1	[illegible]
Oyster Bay	*12,000	18	......	6	....	0	0	0	0	[illegible]
Hempstead	18,160	31	20.[illegible]	12	38.7	0	0	0	0	[illegible]
North Hempstead	8,000	13	1[illegible].50	6	46.15	0	0	0	0	[illegible]
Huntington	8,100	5	......	1	...	0	0	0	0	[illegible]
[illegible]	7,267	9	15.00	1	11.1	0	0	1	1	[illegible]
Sag Harbor	*[illegible]	11	44.[illegible]	3	27.3	1	0	1	[illegible]	[illegible]
[illegible]	*15,[illegible]	2[illegible]	......	11	....	1	0	[illegible]	[illegible]	[illegible]
Port Richmond	*[illegible]	[illegible]	26.67	4	5[illegible]	0	0	1	[illegible]	[illegible]
[illegible]	7,[illegible]	7	12.[illegible]	2	28.5	0	0	[illegible]	[illegible]	[illegible]
[illegible]	*[illegible]	57	22.8[illegible]	31	54.4	0	0	[illegible]	[illegible]	[illegible]
Westchester	*7,[illegible]	9	15.43	4	44.4	0	0	[illegible]	[illegible]	[illegible]
Mount Vernon	*[illegible]	9	......	0	....	0	0	0	0	[illegible]
Sing Sing	*[illegible]	11	1[illegible].4[illegible]	2	20.0	0	0	1	0	[illegible]
New Rochelle	*[illegible]	16	21.82	5	[illegible]	0	0	1	0	[illegible]
Peekskill	7,000	18	30.85	8	44.4	0	0	[illegible]	1	[illegible]
Rest of district	....	[illegible]12	......	110	....	0	0	7	1	[illegible]
HUDSON VALLEY DIST.:										
Totals	....	977	......	333	34.1	4	....	53	11	....
ALBANY	*[illegible]	18[illegible]	22.[illegible]	74	39.[illegible]	0	0	8	0	0
COHOES	*2[illegible]	53	......	23	43.4	0	0	1	1	0
TROY	[illegible]	*148	27.32	58	38.7	1	0	5	0	0
West Troy	*1[illegible]	19	16.00	10	52.6	0	0	0	0	0
Hoosick Falls	*6,[illegible]	10	20.[illegible]	2	20.0	0	0	0	0	0
Lansingburgh	*10,[illegible]	17	2[illegible].40	5	29.4	0	0	0	0	0
Green Island	*5,[illegible]	9	21.[illegible]	3	33.3	0	0	2	0	0
Greenbush	*[illegible]	13	19.50	5	....	0	0	1	0	0
Coxsackie	4,[illegible]	8	24.00	1	12.5	0	0	0	0	0
Catskill	*4,[illegible]	7	18.66	2	28.5	0	0	0	0	0
HUDSON	*1[illegible]	20	24.00	5	25.0	0	0	0	0	0
KINGSTON	*21,[illegible]	41	25.18	14	31.9	0	0	1	4	0
Ellenville	3,[illegible]	3	12.00	1	33.3	0	0	0	0	0
Marbletown	4,[illegible]	6	18.00	1	16.7	0	0	0	0	0
Esopus	4,736	6	15.32	3	50.0	0	0	2	0	0
Saugerties	*4,000	7	21.00	3	42.8	0	0	0	0	0
POUGHKEEPSIE	*20,2[illegible]	30	17.82	10	33.3	0	0	1	[illegible]	0
Fishkill	16,732	19	21.30	3	15.8	0	0	[illegible]	0	0
Wappinger Falls	*5,000	6	14.40	2	33.3	0	0	0	0	0
NEWBURGH	*20,000	40	24.00	15	37.5	1	0	0	2	0
Port Jervis	*9,500	14	17.68	4	28.5	0	0	0	0	0
MIDDLETOWN	*10,000	25	30.00	15	60.0	0	0	0	0	0
Goshen	4,500	11	29.33	4	36.4	0	0	1	0	0
Haverstraw	*7,000	16	27.43	7	43.7	0	0	0	0	0
Nyack	*5,000	5	12.00	1	20.0	0	0	0	0	0
Ramapo	*5,000	16	38.40	2	12.5	0	0	2	0	0
Rest of district	....	236	......	60	....	2	0	8	3	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during August, 1889.

populations preceded by a star (*) are estimated to date ; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
24	14	9	87	204	1,037	282.18	453	668	43	412	307	276	515	130	204	124	832
9	8	6	61	110	684	266.00	265	440	32	264	200	163	255	87	131	39	489
12	4	0	22	80	216	251.33	135	179	9	111	81	79	175	28	41	31	259
0	0	0	0	0	8	363.63	1	1	0	1	2	1	3	0	3	0	2
0	0	0	0	0	0	......	1	2	0	2	0	1	3	0	4	0	2
0	0	0	0	1	10	203.70	4	6	0	0	3	4	7	1	2	4	12
0	0	0	0	0	2	200.00	1	0	0	1	1	1	2	0	2	2	2
0	0	0	0	0	6	280.00	1	2	0	1	1	1	6	1	0	1	4
1	0	1	0	0	5	......	0	3	0	1	0	2	2	0	1	2	0
0	0	0	0	1	7	258.00	0	1	0	3	3	2	3	3	0	4	4
0	0	0	0	2	0	153.80	0	2	0	0	0	0	2	0	2	1	4
0	0	0	0	0	0	......	0	1	0	0	1	0	2	0	0	1	0
0	0	0	0	0	2	333.33	0	1	0	1	0	0	0	1	2	0	1
0	0	0	0	0	1	272.72	1	2	0	0	2	0	1	0	0	1	1
0	0	0	0	0	4	......	2	5	0	0	1	2	4	0	0	2	7
0	0	0	0	0	0	125.00	2	1	0	1	1	1	0	0	0	0	1
0	0	0	0	0	3	428.50	1	1	0	0	0	1	1	0	0	0	0
0	0	0	0	4	13	298.20	6	6	0	2	4	2	10	0	1	1	8
0	0	0	0	0	3	333.33	2	0	0	0	0	0	1	0	0	0	3
0	0	0	0	0	7	......	0	0	0	1	0	0	0	0	0	0	1
0	0	0	0	0	1	200.00	0	3	0	2	1	0	1	0	0	1	1
0	0	0	0	1	2	400.00	1	0	0	0	2	1	1	0	0	0	1
0	0	0	0	0	3	222.22	0	1	0	2	0	1	4	0	1	1	4
2	2	2	4	6	69	......	32	15	2	19	5	17	37	10	16	35	38
12	4	....	7	69	177	323.50	37	108	7	78	32	74	102	22	41	92	67
4	1	0	4	20	15	275.13	6	21	2	24	8	35	19	5	8	8	1
1	1	0	0	1	17	415.10	2	2	1	4	1	6	11	0	2	1	1
0	1	0	0	6	58	469.50	6	12	0	11	3	5	10	0	2	13	15
0	0	0	0	2	5	368.40	1	0	0	1	0	1	3	0	1	1	4
0	0	0	0	2	0	200.00	1	4	0	0	1	0	0	0	1	0	1
0	0	0	1	0	2	176.47	1	4	0	0	0	0	4	1	1	2	1
0	0	0	0	5	0	777.77	2	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	2	......	1	1	0	1	1	1	1	0	0	0	2
0	0	0	0	0	0	......	0	3	0	3	0	0	1	0	0	0	1
0	0	0	0	0	3	428.57	0	0	0	0	0	3	1	0	0	0	0
0	0	0	0	0	6	300.00	0	4	0	3	1	0	1	0	2	1	2
0	0	0	0	9	4	431.81	2	3	2	3	1	5	3	1	3	2	1
0	0	0	0	1	0	333.33	0	0	0	1	0	0	0	0	0	1	0
0	0	0	0	0	0	......	1	1	0	0	0	0	0	2	0	2	0
0	1	0	0	0	1	666.66	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	3	428.71	1	1	0	1	0	0	0	0	0	1	0
0	0	0	0	1	1	133.33	0	6	0	2	1	3	8	2	1	1	2
0	0	0	0	0	0	52.60	2	2	0	1	1	1	1	0	4	6	0
0	0	0	0	0	1	166.67	0	3	0	0	0	0	1	0	0	1	0
0	0	0	0	3	6	300.00	1	2	0	2	4	1	7	3	2	3	3
0	0	0	0	0	3	214.30	1	4	0	0	2	0	0	1	0	1	2
1	0	0	0	0	9	400.00	1	2	0	1	0	1	5	0	0	0	5
1	0	0	0	0	0	181.82	0	0	0	0	0	0	4	0	1	3	1
0	0	0	0	2	2	250.00	2	1	0	5	1	1	0	0	1	0	1
0	0	0	0	0	1	200.00	0	1	0	0	0	1	0	0	0	1	1
0	0	0	1	2	2	437.50	1	3	0	0	0	0	2	0	0	2	1
4	0	0	1	14	36	......	5	28	2	15	7	10	19	7	12	42	21

MONTHLY BULLETIN [illegible]

	Population	Total number of deaths	Representing annual death rate per 1,000 of	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro-spinal fever	Typhus fever	Typhoid fever	Malarial diseases	Small-pox
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

AUGUST — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhoeal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhoeal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
....	....	....	1	7	69	335.70	10	29	3	21	9	18	28	7	9	37	18
0	0	0	0	0	2	285.71	0	2	0	2	0	0	0	0	0	1	0
0	0	0	0	0	2	222.22	1	1	0	1	0	2	0	0	0	0	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	2
0	0	0	0	0	2	500.00	0	1	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	1	142.85	0	0	0	0	0	1	2	2	0	1	0
0	0	0	0	0	1	200.00	0	2	0	0	0	0	1	0	0	0	1
0	0	0	0	0	7	421.25	0	1	0	3	1	0	1	0	1	3	1
0	0	0	0	0	2	334.33	0	1	0	0	0	0	2	0	0	1	0
0	0	0	0	0	5	428.50	0	2	0	2	0	0	0	0	0	1	3
0	0	0	1	1	13	454.54	0	6	0	2	2	1	3	0	1	4	0
0	0	0	0	0	2	181.82	0	1	0	0	1	0	1	0	0	0	0
0	0	0	0	0	2	400.00	1	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	1	0	0	0	2	1	0	2	1	0
0	0	0	0	6	30	.....	8	11	3	10	5	11	16	5	5	24	10
2	2	1	8	13	104	315.60	19	51	....	28	14	33	44	22	18	52	38
0	1	0	0	0	7	333.33	2	4	0	0	2	3	1	1	0	2	5
0	0	0	0	0	1	250.00	1	0	0	1	0	1	0	0	0	0	0
0	0	0	0	0	3	444.44	0	0	0	1	0	0	0	1	1	2	0
0	0	0	0	0	10	......	2	4	0	1	0	1	3	1	4	1	0
0	0	0	0	0	4	266.67	0	0	0	1	0	1	5	2	0	1	1
0	0	0	0	0	5	428.50	0	3	0	0	0	0	2	0	0	1	2
0	0	0	0	2	1	228.57	1	2	0	1	0	0	3	1	0	1	1
2	C	0	3	0	24	300.00	6	13	0	7	3	9	10	6	5	3	7
0	0	0	2	0	2	375.00	0	1	0	1	0	1	0	0	0	0	0
0	0	0	0	3	9	480.00	0	2	0	0	0	1	2	1	0	3	3
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	1	0
0	0	0	0	0	1	142.85	0	1	0	1	0	0	0	0	2	0	2
0	0	6	0	0	2	250.00	0	1	0	0	0	0	1	0	1	0	3
0	0	0	0	0	2	666.67	0	0	0	2	0	0	0	0	0	0	0
0	0	0	1	1	3	260.87	2	2	0	0	2	1	3	0	0	2	5
0	1	1	2	4	30	.....	5	16	0	12	7	15	14	9	5	35	9
5	....	....	4	2	62	273.80	8	29	3	28	12	29	35	8	8	38	51
0	0	0	0	0	8	486.50	0	3	0	3	1	3	9	1	0	2	3
0	0	0	0	0	0	.....	1	0	0	1	0	0	1	0	0	0	1
0	0	0	0	0	6	545.45	0	1	0	0	0	3	1	0	0	0	0
0	0	0	0	0	1	166.67	0	1	0	1	0	1	2	0	0	0	0
1	0	0	1	0	10	326.10	3	5	1	1	2	3	7	0	1	1	7
0	0	0	0	0	1	250.00	0	0	0	1	0	1	0	0	0	1	0
0	0	0	0	0	1	200.00	0	1	0	0	0	0	2	0	0	1	0
0	0	0	0	0	1	287.14	0	1	0	0	1	2	1	0	0	0	0
0	0	0	0	1	4	384.60	0	1	0	2	0	0	0	0	1	0	3
0	0	0	0	0	4	444.44	0	0	0	0	0	1	2	0	1	0	1
0	0	0	0	0	1	235.30	2	1	0	6	2	1	0	0	0	1	0
0	0	0	1	0	0	......	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	1	0	0	1	1	0	1	0
4	0	0	2	1	25	.....	2	15	2	12	6	14	9	6	5	30	26
7	....	....	5	6	104	370.50	8	42	5	15	17	26	34	15	17	47	19
0	0	0	0	0	0	......	0	1	0	0	1	1	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	0	0

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
EAST CENT. DIST.-(*Cont.*):										
Cooperstown	*3,000	2	8.00	0	....	0	0	0	0	0
Oneonta	*7,000	12	20.57	4	33.3	0	0	1	0	0
Worcester	*3,000	2	8.00	1	50.0	0	0	0	0	0
Cazenovia	4,363	5	13.64	2	40.0	0	0	0	0	0
Brookfield	3,685	2	6.50	2	100.0	0	0	0	0	0
Norwich	5,500	9	19.64	7	66.7	0	0	0	0	0
Hamilton	3,912	4	12.31	1	25.0	0	0	0	0	0
Oneida	*5,000	9	21.60	5	55.5	0	0	0	1	0
Baldwinsville	3,000	1	4.00	0	....	0	0	0	0	0
SYRACUSE	*80,000	138	20.70	55	39.8	0	0	3	4	0
Cortland	*9,000	15	20.00	4	26.7	1	0	3	0	0
Homer	3,000	4	16.00	0	....	0	0	1	0	0
Rest of district	....	185	......	50	27.0	1	0	9	2	0
WEST CENTRAL DIST.:										
Totals	....	258	......	54	20.8	..	....	4	1	....
AUBURN	*26,000	44	20.31	12	37.3	0	0	0	0	0
ITHACA	*10,000	11	13.20	1	9.1	0	0	0	0	0
Waterloo	*4,500	4	10.67	2	50.0	0	0	0	0	0
Seneca Falls	*6,000	6	12.00	1	16.7	0	0	1	0	0
Manchester	*4,000	6	18.00	1	16.7	0	0	0	0	0
Phelps	*7,000	6	10.30	1	16.7	0	0	0	0	0
Canandaigua	*6,300	10	19.05	1	10.0	0	0	1	0	0
Geneva	*6,000	13	26.00	6	46.1	0	0	0	0	0
Penn Yan	*4,500	2	5.33	1	50.0	0	0	0	0	0
Rest of district	....	156	......	28	17.8	0	0	2	1	0
LAKE ONTARIO AND WESTERN DIST.:										
Totals	....	1,134	......	549	48.4	8	....	23	8	...
OSWEGO	*24,000	41	20.50	16	39.2	1	0	0	0	0
Richland	4,000	6	18.00	2	33.3	0	0	1	0	0
Clyde	*3,000	3	12.00	2	76.7	0	0	0	0	0
Lyons	*6,000	11	22.00	3	27.3	1	0	0	1	0
Newark	3,500	8	27.42	4	50.0	0	0	1	0	0
Palmyra	*4,800	12	30.00	7	58.3	0	0	0	0	0
ROCHESTER	*110,000	219	23.90	107	48.8	0	0	4	0	0
Brockport	4,500	3	8.00	1	33.3	0	0	0	0	0
Medina	4,000	4	12.00	2	50.0	0	0	0	0	0
Albion	*5,000	9	21.30	2	22.2	0	0	0	0	0
LOCKPORT	*15,000	18	14.40	9	50.0	0	0	0	0	0
BUFFALO	*230,000	†586	26.48	336	57.3	5	0	11	6	0
Tonawanda	5,000	14	33.60	6	42.8	0	0	2	0	0
Amherst	4,578	5	13.05	2	40.0	0	0	0	0	0
Rest of district	....	195	......	50	25.5	1	0	4	1	0
Totals for the State	....	9,373	......	4,059	40.7	33	...	224	96	0
Totals for August, 1888	....	10,017	......	4,867	48.7	29	...	174	87	6

† Thirty-four deaths reported from dysentery.

REMARKS.— The average mortality for August for the last five years is 8.668; that of average proportion of infant mortality for five years is 45.5 per cent, and of deaths from 280.75. From diarrhœal diseases there are fewer deaths than usual in August, and month. The per cent of deaths from this cause in August for four preceding years is Brooklyn; Binghamton reports an unusual number of deaths. Special prevalence is year ago. From consumption 109.46 deaths in each 1,000 occurred, and 193.00 per 1,000

NOTE.—For boundaries of Sanitary

AUGUST — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	1	500.00	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	2	333.33	1	2	0	1	0	0	1	0	1	0	3
0	0	0	0	0	1	500.00	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	2	400.00	0	0	0	0	0	1	0	0	1	1	0
0	0	0	0	0	0	....	0	0	0	0	0	6	1	0	0	0	1
0	0	0	1	0	6	777.77	0	1	0	1	0	0	0	0	0	0	0
0	0	0	0	0	1	250.00	0	0	0	1	0	0	1	0	0	0	1
0	0	0	0	0	5	666.66	0	0	0	0	0	1	0	0	0	1	1
0	0	0	0	0	0	....	0	0	0	0	0	1	0	0	0	0	0
6	0	0	1	5	42	442.00	5	25	2	4	1	10	13	3	8	6	0
0	0	0	0	0	4	267.18	0	1	0	0	1	0	2	1	0	1	1
0	0	0	0	0	0	250.00	0	0	0	1	0	0	1	0	0	1	0
1	0	0	3	1	40	308.10	2	12	3	7	13	12	14	10	7	37	11
1	1	....	....	12	33	161.50	10	33	2	21	11	10	38	14	13	39	15
0	0	0	0	5	6	250.00	2	7	2	5	2	0	6	3	2	2	2
0	0	0	0	1	0	91.90	0	1	0	1	3	0	2	0	0	3	0
0	0	0	0	0	2	500.00	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	166.67	0	0	0	0	1	0	2	0	1	0	1
0	0	0	0	0	1	166.67	1	1	0	0	0	0	1	0	0	1	1
0	0	0	0	0	0	......	0	2	0	0	0	1	1	0	0	2	0
0	0	0	0	0	1	200.00	0	1	0	2	0	1	1	1	0	1	1
0	0	0	0	0	1	76.90	1	3	0	1	0	0	1	0	0	3	3
0	0	0	0	0	1	500.00	0	1	0	0	0	0	0	0	0	0	0
0	1	0	0	6	21	205.10	6	17	0	12	5	8	23	10	10	26	7
3	1	....	21	14	315	345.75	46	66	....	77	35	74	140	36	63	48	156
3	0	0	0	0	9	243.90	1	4	0	4	1	6	5	3	1	2	3
1	0	0	1	0	1	333.33	0	0	0	1	0	0	0	0	0	2	0
0	0	0	0	0	2	666.66	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	1	272.72	0	0	0	0	1	1	3	1	1	0	1
0	0	0	1	0	1	375.00	0	0	0	0	0	0	2	0	2	1	0
0	0	0	0	0	6	500.00	0	1	0	0	0	1	1	0	0	2	1
0	0	0	4	3	59	318.50	16	15	0	14	9	11	38	3	14	14	15
0	0	0	0	0	1	333.33	0	0	0	0	0	0	2	0	0	0	0
0	0	0	0	0	1	250.00	0	0	0	0	0	0	1	1	0	0	1
0	0	0	0	0	2	222.22	0	2	0	1	0	0	0	3	1	0	0
0	0	0	0	0	6	333.33	0	2	0	1	1	2	1	2	1	0	3
2	1	0	12	10	‡183	....	21	29	0	37	13	31	61	14	32	0	116
0	0	0	0	0	3	357.14	1	1	0	2	0	0	2	0	2	0	1
0	0	0	0	0	0	......	0	1	0	1	0	0	1	1	0	1	0
0	0	0	3	1	40	255.00	5	11	0	16	10	22	24	8	9	25	15
54	22	10	133	327	1901	280.75	591	1,026	63	680	437	540	936	254	373	477	1196
120	73	9	144	345	2465	345.82	528	959	74	647	401	473	1010	227	370	530	1345

‡ For five weeks ending August 31

August, 1889, is 9,373, which is less by 600 than that reported for August, 1888. The zymotic diseases 332.27 per 1,000; for this month the proportions are respectively 40 7 and about 1,200 less than in July. There is an increase in typhoid fever, which began last 1.72; of this month it is 2.40. The increase over last year is principally in New York and not reported from any place. Scarlet fever and measles are much less prevalent than a deaths above the age of five years.

Districts see Annual Summary.

MONTHLY BULLETINS OF THE NEW

Abstract of reports of deaths and their causes in the

[Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT:										
Totals	....	4,982	......	2,091	43.0	4	....	97	54	....
NEW YORK CITY	*1,571,358	2,913	22.50	1,221	42.0	1	0	57	26	0
BROOKLYN	*821,326	1,391	20.31	646	46.2	0	0	26	22	0
Gravesend	*6,000	18	36.00	9	50.0	0	0	1	0	0
New Utrecht	*5,000	10	24.00	2	20.0	0	0	1	0	0
LONG ISLAND CITY	*40,000	56	16.90	32	57.1	0	0	0	0	0
Flatbush	*8,000	13	19.50	1	7.7	0	0	1	1	0
Newtown	*10,000	28	33.60	12	42.8	0	0	0	1	0
Oyster Bay	*12,000	12	......	7	....	0	0	0	0	0
Hempstead	18,100	24	15.91	9	37.5	0	0	0	0	0
North Hempstead	8,000	7	10.50	2	28.5	0	0	0	0	0
Huntington	8,100	9	13.33	3	33.3	0	0	0	0	0
Southold	7,267	11	18.10	4	36.3	0	0	0	1	0
Sag Harbor	*3,000	4	16.00	4	100.0	0	0	0	0	0
New Brighton	15,000	33	26.40	11	33.3	1	0	1	0	0
Edgewater	12,000	20	20.00	7	35.0	0	0	0	0	0
Port Richmond	*3,600	7	23.33	1	14.3	1	0	0	0	0
Westfield	7,000	12	20.57	4	33.3	0	0	0	1	0
YONKERS	*30,000	48	19.20	23	47.8	0	0	2	0	0
Westchester	*7,000	7	12.00	4	57.1	0	0	0	0	0
Mount Vernon	*8,000	21	31.50	12	57.1	0	0	1	0	0
Portchester	*4,000	3	9.00	4	33.3	0	0	0	0	0
Sing Sing	*8,500	7	9.10	5	71.4	0	0	0	0	0
New Rochelle	*5,500	10	21.82	5	50.0	0	0	0	0	0
Peekskill	7,000	10	17.14	6	60.0	0	0	6	0	0
Rest of district	....	187	......	50	27.0	1	0	7	2	0
HUDSON VALLEY DIST.										
Totals	....	839	......	241	28.6	4	....	39	15	....
ALBANY	*103,000	178	20.74	55	30.6	2	0	16	2	0
COHOES	*20,000	33	19.80	11	33.3	0	0	0	0	0
TROY	*63,000	128	25.47	40	29.0	1	0	6	0	0
West Troy	*13,000	20	18.46	6	30.0	0	0	1	0	0
Hoosick Falls	*6,000	10	20.00	4	40.0	0	0	0	0	0
Lansingburgh	*10,000	24	28.80	5	20.8	0	0	3	0	0
Green Island	*5,000	6	14.40	6	100.0	0	0	0	0	0
Greenbush	*8,000	16	24.00	5	31.2	0	0	3	0	0
Coxsackie	4,000	1	......	0	...	0	0	0	0	0
Catskill	*4,500	3	8.00	0	...	0	0	0	0	0
HUDSON	*10,000	20	24.00	9	45.0		0	0	1	0
KINGSTON	*21,000	36	20.15	16	44.4		0	1	2	0
Marbletown	4,000	6	18.00	5	83.3		0	0	0	0
Esopus	4,736	11	27.78	3	27.3	0	0	1	0	0
Saugerties	*4,000	2	6.00	0	...		0	0	0	0
POUGHKEEPSIE	*20,200	31	18.42	2	6.4		0	2	0	0
Fishkill	10,732	7	......	2	....		0	0	0	0
Wappinger Falls	*5,000	6	14.40	0	...	0	0	0	0	0
NEWBURGH	*20,000	24	14.40	6	25.0	0	0	0	0	0
Port Jervis	*9,500	6	7.60	1	16.7	0	0	0	0	0
Middletown	*10,000	12	14.40	3	25.0	0	0		0	0
Goshen	4,500	4	10.67	1	25.0	0	0	0	0	0
Haverstraw	*7,000	11	18.85	5	45.5	0	0	0	1	0
Ramapo	*5,000	4	9.60	1	25.0	0	0	0	0	0
Rest of district	....	230	......	55	19.5	0	0	5	9	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during September, 1889.

populations preceded by a star (*) are estimated to date: the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
21	7	9	53	203	556	206.50	485	640	40	366	663	251	474	102	185	119	533
12	3	5	41	100	375	213.75	310	422	27	200	564	142	243	66	117	42	160
6	1	4	9	82	116	190.50	149	157	9	116	68	78	159	22	46	36	285
0	0	0	0	0	2	166.67	3	0	0	1	1	4	4	0	0	0	2
0	1	0	0	1	0	300.00	0	1	0	3	1	0	0	0	2	0	0
0	0	0	0	8	10	321.43	7	7	1	2	6	0	6	0	0	0	9
0	0	0	0	3	0	384.50	0	2	0	2	0	0	2	0	2	0	0
0	0	0	1	1	2	178.55	0	0	0	7	2	0	2	0	1	2	10
0	0	0	0	0	3	......	1	0	0	1	0	0	2	0	2	0	3
0	0	0	0	0	2	83.33	1	2	0	3	2	2	5	0	0	4	3
0	0	0	0	0	1	142.85	0	2	0	0	0	0	3	1	0	0	0
0	0	0	0	0	1	111.11	0	3	0	0	0	0	0	0	1	2	2
0	0	0	0	0	0	91.90	0	0	0	1	0	0	0	1	1	3	4
0	1	0	0	0	1	500.00	0	0	0	0	0	0	1	0	0	0	1
1	0	0	0	0	3	181.81	1	3	0	1	0	2	4	1	3	6	6
0	0	0	0	1	2	150.00	1	3	0	1	0	1	5	0	0	1	5
0	0	0	0	0	1	142.85	0	0	0	1	0	1	2	0	1	0	0
0	0	0	0	0	2	333.33	1	1	0	1	1	3	1	0	1	0	0
0	0	0	0	0	8	208.33	4	6	0	2	3	2	8	2	2	2	7
0	0	0	0	0	1	142.85	0	0	1	0	0	1	2	0	0	1	1
1	1	0	0	1	6	476.18	0	3	0	2	1	1	1	0	0	0	3
0	0	0	0	0	1	333.33	0	0	0	1	0	0	0	0	0	1	0
0	0	0	0	2	2	800.00	0	0	0	1	0	0	0	0	0	2	0
0	0	0	0	1	0	100.00	2	0	0	1	0	1	2	0	2	0	1
0	0	0	0	0	1	100.00	0	0	0	0	1	0	1	2	0	1	4
1	0	0	2	3	16	163.40	8	28	2	19	13	13	21	7	4	16	27
15	....	2	6	48	88	258.34	54	104	6	69	36	79	95	22	37	64	56
8	0	1	2	12	9	288.90	12	19	0	20	13	26	11	8	15	6	1
3	0	0	0	1	5	272 72	4	3	0	1	2	2	5	0	1	5	1
3	0	1	4	7	25	340.56	8	13	2	8	4	9	16	2	4	8	17
0	0	0	0	0	1	100.00	1	6	0	2	2	0	2	1	2	0	2
0	0	0	0	1	0	100.00	0	2	0	0	0	2	2	0	0	0	3
0	0	0	0	3	0	250.00	3	3	0	2	2	0	4	2	0	0	2
0	0	0	0	0	3	500.00	1	0	0	0	0	0	2	0	0	0	0
0	0	0	0	1	0	250.00	1	2	0	4	1	0	1	0	0	0	3
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	0	6
0	0	0	0	0	0	......	1	1	0	0	0	0	1	0	0	0	0
1	0	0	0	1	4	350.00	2	2	0	1	0	2	4	0	0	2	0
0	0	0	0	8	3	416.67	2	2	0	4	2	2	3	3	2	1	0
0	0	0	0	0	4	666.66	0	0	0	1	0	0	0	0	0	0	1
0	0	0	0	0	1	181.82	1	1	0	1	0	2	1	1	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	2	0
0	0	0	0	0	0	64.50	1	6	0	3	1	8	2	0	0	5	3
0	0	0	0	1	1	.....	1	1	0	0	0	0	1	0	1	0	1
0	0	0	0	0	0	......	0	1	0	2	0	0	0	1	0	1	1
0	0	0	0	1	2	125.00	2	4	2	1	2	2	1	3	2	0	2
0	0	0	0	0	0	......	0	0	0	0	0	0	3	0	3	0	0
0	0	0	0	0	2	250.00	0	2	0	0	0	1	2	1	1	1	1
0	0	0	0	0	0		2	1	0	0	0	0	1	0	0	0	0
0	0	0	0	4	0	454.54	0	0	0	0	0	1	1	0	2	0	2
0	0	0	0	1	0	250.00	0	0	1	0	0	0	1	0	0	0	1
0	0	0	0	7	28	213.00	12	35	1	19	7	22	31	5	3	32	14

MONTHLY BULLETIN FOR

	Population.	Total number of deaths.	Corresponding annual death rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small pox.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SEPTEMBER — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
1	....	1	5	13	50	300.00	17	18	1	16	8	15	27	12	5	35	32
0	0	0	0	0	0	......	1	2	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	2	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	500.00	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	2	333.33	0	1	0	0	0	0	0	0	0	1	0
0	0	0	0	1	2	230.80	2	0	0	1	0	2	1	2	0	1	1
0	0	0	0	2	2	285.71	0	0	1	2	0	0	1	1	0	2	3
0	0	0	0	0	3	600.00	0	0	0	0	0	0	1	0	0	1	0
0	0	0	1	4	0	533.33	1	1	0	0	1	0	1	1	0	0	2
0	0	0	0	0	0	250.00	0	0	0	0	1	0	1	0	1	0	3
0	0	0	0	0	1	100.00	1	1	0	2	1	0	2	0	0	2	0
0	0	0	0	2	0	285.71	0	0	0	1	0	1	1	0	0	1	1
0	0	0	1	1	2	307.70	0	1	0	0	1	2	1	0	1	0	3
0	0	0	0	0	1	333.33	1	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	250.00	0	0	0	0	0	0	0	0	0	2	1
1	0	0	3	2	37	243.50	8	11	0	10	4	10	18	7	3	24	17
4	....	...	3	29	53	257.45	24	33	3	33	22	34	52	13	14	51	44
1	0	0	0	4	5	275.00	5	2	0	2	1	2	6	0	2	3	6
0	0	0	0	0	1	250.00	1	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	1	2	0	1	1	0	1
0	0	0	0	10	2	378.38	2	3	0	2	3	4	2	2	1	1	3
0	0	0	0	0	0	......	1	0	0	1	1	0	1	1	1	1	0
0	0	0	0	0	2	222.22	1	1	0	0	1	3	4	0	0	0	4
0	0	0	0	2	0	363.64	0	0	0	0	0	1	3	0	1	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	1	1
2	0	0	2	4	5	......	6	11	1	6	5	4	8	2	2	3	10
0	0	0	0	0	1	250.00	0	0	0	2	0	0	0	0	1	0	0
0	0	0	0	4	1	241.39	1	4	1	3	0	1	3	0	0	4	5
0	0	0	0	0	1	400.00	0	0	0	0	0	0	1	0	0	2	0
0	0	0	0	0	1	166.67	0	0	0	1	0	1	1	0	0	2	0
0	0	0	0	0	2	400.00	1	1	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	333.33	0	0	0	0	1	0	0	0	0	1	0
0	0	0	0	4	4	333.33	2	3	0	1	4	4	0	0	1	1	2
1	0	0	1	1	28	258.00	4	8	1	15	5	12	21	7	4	30	10
5	....	....	1	8	55	309.10	7	24	2	35	10	16	37	9	14	36	29
0	0	0	0	0	3	243.20	3	3	0	6	0	2	7	2	2	0	3
0	0	0	0	0	3	600.00	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	4	500.00	0	0	0	2	0	0	0	0	0	2	0
0	0	0	0	0	0	200.00	0	0	0	1	0	1	0	0	1	1	0
1	0	0	0	1	9	450.00	0	5	0	3	0	2	4	1	0	1	4
1	0	0	0	0	0	500.00	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	1	142.85	1	0	0	0	0	1	0	0	0	4	0
0	0	0	0	1	4	666.67	0	0	0	0	0	1	0	0	1	0	1
0	0	0	0	0	1	200.00	0	1	0	1	0	0	0	0	1	0	1
0	0	0	0	0	0	87.00	0	2	1	8	2	3	1	0	3	1	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	1	1	0	1	0
3	0	0	1	6	30	310.45	3	12	1	14	7	6	23	5	6	25	18
3	....	1	2	13	80	325.00	17	35	6	25	13	30	35	15	12	41	27
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	2	0	0	0	0

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of —	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
Cooperstown	*3,000	3	12.00	1	33.3	0	0	1	0	
Oneonta	*7,000	12	20.57	5	41.6	0	0	0	0	
Worcester	*3,000	3	12.00	0	....	0	0	0	1	
Cazenovia	4,363	13	35.45	2	15.4	0	0	0	0	
Brookfield	3,685	6	49.45	1	16.7	0	0	0	0	
Norwich	5,500	13	28.36	7	53.8	0	0	2	0	
Hamilton	3,912	8	24.00	3	37.5	0	0	1	0	
Oneida	*5,000	1	......	0	....	0	0	0	0	
SYRACUSE	*80,000	114	17.81	39	34.2	0	0	3	2	
Cortland	*9,000	12	16.00	5	41.6	0	0	4	0	
Homer	3,000	7	28.00	2	28.5	0	0	1	0	
Rest of district	....	188	......	46	24.2	4	0	14	0	...
WEST CENTRAL DIST.: Totals	....	256	......	58	22.6	0	....	4	2	...
AUBURN	*26,000	31	14.31	5	16.1	0	0	0	0	
Ithaca	*10,000	10	12.00	4	40.0	0	0	0	0	
Waterloo	*4,500	6	16.00	1	16.7	0	0	0	0	
Seneca Falls	*6,000	2	......	0	....	0	0	0	0	
Manchester	*4,000	8	24.00	3	37.5	0	0	1	0	
Phelps	*7,000	8	13.57	3	37.5	0	0	1	0	
Canandaigua	*6,300	2	......	0	....	0	0	0	0	
Geneva	*6,000	19	38.00	5	26.3	0	0	0	0	
Penn Yan	*4,500	5	13.33	1	20.0	0	0	1	0	
Dansville	*3,700	6	19.46	1	16.7	0	0	0	0	
Rest of district	....	159	......	35	22.0	0	0	1	2	
LAKE ONTARIO AND WESTERN DISTRICT.: Totals	....	902	......	378	42.0	4	....	36	11	
OSWEGO	*24,000	24	12.00	11	45.6	0	0	1	0	
Richland	4,000	6	18.00	3	50.0	0	0	0	0	
Clyde	*3,000	3	12.00	1	33.3	0	0	0	0	
Lyons	*6,000	13	26.00	6	46.1	0	0	1	0	
Newark	3,500	3	10.30	2	....	0	0	0	0	
Palmyra	*4,800	5	12.50	2	40.0	0	0	1	0	
ROCHESTER	*130,000	172	15.87	84	48.2	0	0	6	0	
Brockport	4,500	3	8.00	0	....	0	0	0	0	
Medina	4,000	7	21.00	0	....	0	0	3	0	
Albion	*5,000	6	14.40	4	66.7	0	0	0	0	
LOCKPORT	*15,000	15	15.00	4	26.7	0	0	2	0	
Niagara	7,500	14	22.40	3	21.4	0	0	2	0	
BUFFALO	*230,000	†390	21.18	204	52.3	2	0	8	6	
Tonawanda	5,000	15	36.00	4	26.7	1	0	2	0	
Amherst	4,578	5	13.04	0	....	0	0	0	0	
Rest of district	....	221	......	50	22.7	1	0	10	5	
Totals for the State	....	8,264	......	3,179	38.4	19	....	247	98	
Totals for Sept., 1888	....	8,433	......	3,877	45.9	31	....	279	102	1

† For four week

REMARKS.— The average mortality for September for the last five years is 7,690; or 5
the average, which is about 41 per cent. From all zymotic diseases the proportion o
years; that of this month is 234.26. About half of the zymotic mortality is from dis
number of the deaths in this class are returned as dysentery. About 2.8 per cent of al
month 3 per cent of the mortality is from this cause; in August, 2.40. There is a
1,000 deaths from consumption; 186.10 per 1,000 above five years of age.

NOTE.— For boundaries of Sanitar

SEPTEMBER — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	333.33	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	5	416.67	0	0	0	0	0	1	0	0	1	1	4
0	0	0	0	0	0	333.33	0	1	0	1	0	0	0	0	0	0	0
0	0	0	0	0	4	317.70	1	1	0	2	0	2	0	1	1	1	0
0	0	0	0	0	1	166.67	0	2	0	0	1	0	0	0	0	2	0
0	0	1	0	1	5	692.30	0	0	0	0	0	1	0	1	0	0	2
0	0	0	0	0	3	500.00	1	1	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	0	0
2	0	0	2	10	23	368.42	9	13	4	8	1	8	13	6	1	7	2
0	0	0	0	0	1	166.67	1	1	0	0	0	3	0	0	1	1	3
1	0	0	0	0	1	428.57	0	0	0	0	1	0	0	1	0	0	2
0	0	0	0	2	37	300.00	5	16	2	13	10	15	18	6	7	25	14
....	....	...	2	4	46	226.55	6	29	....	17	8	20	36	9	15	36	22
0	0	0	1	3	3	225.80	3	6	0	1	1	3	4	1	2	1	2
0	0	0	0	0	2	200.00	0	2	0	0	0	2	0	0	0	2	2
0	0	0	0	0	0	......	1	0	0	0	0	1	1	1	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	1	0
0	0	0	0	0	2	375.00	0	0	0	0	1	0	2	1	0	0	1
0	0	0	0	0	1	250.00	0	0	0	1	0	1	1	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	0	0
0	0	0	0	0	1	52.63	0	6	0	3	0	1	2	1	1	2	2
0	0	0	0	0	1	400.00	0	0	0	1	0	0	0	0	0	2	0
0	0	0	0	0	1	166.67	0	1	0	3	0	1	0	0	0	0	0
0	0	0	1	1	35	250.00	2	14	0	8	6	10	25	5	11	26	12
4	2	1	18	25	166	298.80	36	66	7	77	34	38	114	24	44	64	129
0	0	0	1	0	3	308.33	1	0	1	2	1	4	7	0	2	0	1
0	0	0	0	0	2	333.33	1	0	0	0	0	1	0	1	0	0	1
0	0	0	0	0	1	333.33	0	0	0	0	0	0	0	1	1	0	0
1	0	0	0	1	2	384.61	2	1	0	0	0	0	4	0	0	0	1
0	0	0	0	0	1	333.33	0	0	0	0	0	0	0	0	1	0	1
0	0	0	0	0	0	200.00	1	0	0	1	0	0	1	0	0	1	0
0	2	0	3	5	30	264.38	9	15	1	14	9	6	24	4	6	17	21
0	0	0	0	0	0	......	0	0	0	0	1	0	1	0	0	1	0
0	0	0	0	0	0	428.50	0	1	0	1	0	0	0	1	0	0	1
0	0	0	0	0	2	333.33	0	1	0	0	1	0	0	0	0	2	0
0	0	0	1	0	2	333.33	0	2	1	0	1	0	0	0	1	0	3
0	0	0	0	0	2	285.71	0	2	0	0	2	0	3	1	0	1	4
2	0	1	9	17	76	315.40	16	30	1	39	10	14	44	10	19	0	81
1	0	0	1	0	1	400.00	0	1	0	0	0	0	0	0	2	4	2
0	0	0	0	0	0	......	0	0	0	0	1	1	1	0	1	1	0
0	0	0	3	2	44	285.00	6	13	3	20	8	12	27	6	11	37	13
53	9	14	90	343	1,094	234.26	646	949	65	638	794	483	870	206	326	446	872
114	43	11	142	308	1,440	294.32	649	895	69	600	343	494	895	198	308	510	995

ending September 28.

less than that of September, 1889. The proportion of infant mortality is a little below
deaths in each 1,000 deaths from all causes was 266.75 during September of the last five
rhœal diseases, which is less than the average for September of recent years; a good
deaths occurred from typhoid fever in September of the four preceding years; this
material change in the prevalence of other zymotic diseases. There were 114.83 per

Districts, see Annual Summary.

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

†Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT:										
Totals	....	4,625	......	1,526	32.9	6	....	103	55	....
NEW YORK CITY	*1,571,558	2,724	20.38	926	33.9	6	0	57	30	0
BROOKLYN	*821,525	1,306	19.08	454	35.0	0	0	24	15	0
Gravesend	*5,000	9	21.60	2	22.2	0	0	0	2	0
New Utrecht	*5,000	15	36.00	3	20.0	0	0	1	1	0
LONG ISLAND CITY	*40,000	60	18.00	26	43.3	0	0	1	1	0
Flatbush	*8,000	17	25.50	6	17.2	0	0	2	0	0
Newtown	*10,000	30	36.00	12	40.0	0	0	0	0	0
Oyster Bay	*12,000	16	16.00	1	6.2	0	0	0	0	0
Hempstead	18,160	31	20.44	11	35.5	0	0	0	0	0
North Hempstead	8,000	13	19.50	3	23.1	0	0	0	0	0
Huntington	8,100	5	7.50	1	20.0	0	0	1	0	0
Southold	7,267	7	11.60	2	28.5	0	0	0	1	0
Sag Harbor	*3,000	7	28.00	3	42.8	0	0	1	0	0
New Brighton	*15,000	32	24.25	4	12.5	0	0	1	0	0
Port Richmond	*3,600	11	36.67	2	18.2	0	0	0	1	0
Westfield	7,000	6	10.18	1	16.7	0	0	1	0	0
YONKERS	*30,000	46	......	13	28.2	0	0	2	1	0
Westchester	*7,000	12	20.55	3	25.0	0	0	0	0	0
Mount Vernon	*11,000	27	29.45	9	33.3	0	0	0	0	0
Portchester	*4,000	2	6.00	0	....	0	0	0	0	0
Sing Sing	*6,500	9	16.61	2	22.2	0	0	0	1	0
New Rochelle	*5,500	12	26.18	2	16.7	0	0	0	0	0
Peekskill	*7,000	10	17.15	2	20.0	0	0	0	0	0
Rest of district	....	219	......	41	19.0	0	0	12	2	0
HUDSON VALLEY DIST.:										
Totals	....	983	......	210	21.3	3	....	37	10	....
ALBANY	*103,000	207	24.11	62	30.0	1	0	14	0	0
COHOES	*20,000	39	23.40	14	35.9	0	0	0	0	0
TROY	*65,000	139	25.66	37	26.6	0	0	8	0	0
West Troy	*13,000	24	22.15	3	12.5	0	0	0	0	0
Hoosick Falls	*6,000	15	30.00	3	20.0	0	0	1	0	0
Lansingburgh	*10,000	18	21.60	4	22.2	0	0	0	0	0
Green Island	*5,000	5	12.00	2	40.0	0	0	0	0	0
Greenbush	*8,000	14	21.00	3	21.5	0	0	3	0	0
Coxsackie	4,000	4	12.00	0	....	0	0	1	0	0
Catskill	*4,500	7	18.67	2	28.5	0	0	0	1	0
HUDSON	*10,000	21	25.20	4	19.0	0	0	1	1	0
KINGSTON	*21,000	41	23.43	13	31.7	1	0	0	2	0
Ellenville	3,000	3	12.00	0	....	0	0	0	0	0
Marbletown	4,000	9	27.00	1	11.1	0	0	0	0	0
Esopus	4,736	8	20.27	1	12.5	0	0	0	0	0
Saugerties	*4,000	8	24.00	1	12.5	0	0	0	1	0
POUGHKEEPSIE	*20,200	31	18.41	6	19.4	0	0	0	1	0
Fishkill	10,732	14	15.70	6	42.8	0	0	0	0	0
Wappinger Falls	*5,000	5	12.00	0	...	0	0	0	0	0
NEWBURGH	*20,000	28	16.80	5	17.8	0	0	0	0	0
Port Jervis	*9,500	18	22.73	3	16.2	0	0	1	0	0
Middletown	*10,000	29	34.80	4	13.8	0	0	0	0	0
Goshen	4,500	12	32.00	2	16.7	1	0	0	0	0
Haverstraw	*7,000	20	34.28	5	25.0	0	0	0	0	0
Ramapo	*5,000	10	25.00	2	20.0	0	0	0	0	0
Rest of district	....	254	......	27	10.8	0	0	8	4	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during October, 1889.

populations preceded by a star (*) are estimated to date; the remainder are from the of 1880.

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
26	5	10	46	306	220	168.00	650	645	34	289	303	285	499	123	190	119	711
19	5	8	33	123	161	162.25	390	412	25	168	189	161	243	73	139	46	436
5	0	2	8	131	39	172.30	204	162	6	86	81	84	171	33	33	23	198
0	0	0	0	1	0	333.33	1	0	0	1	0	1	1	0	1	0	1
0	0	0	0	1	1	266.67	3	1	1	1	2	0	0	0	0	1	2
0	0	0	0	15	4	350.00	7	3	1	2	5	3	3	1	3	2	9
0	0	0	1	6	0	529.40	0	1	0	4	0	1	1	0	0	0	1
0	0	0	0	8	0	266.67	2	1	0	0	0	0	4	1	0	4	10
0	0	0	0	0	1	62.50	2	2	0	2	1	3	1	1	0	2	1
0	0	0	0	1	2	355.00	2	3	0	3	2	2	6	0	1	3	6
0	0	0	0	3	0	230.70	1	0	0	2	1	0	2	1	1	1	1
0	0	0	0	0	0	200.00	0	0	0	1	0	0	2	0	0	1	0
0	0	0	0	0	0	142.85	0	2	0	0	0	0	0	0	0	2	2
0	0	0	0	0	1	285.70	1	2	0	0	0	1	0	0	0	0	1
0	0	0	2	1	0	125.00	1	4	0	0	3	2	5	4	1	8	0
0	0	0	0	1	0	181.81	1	3	0	1	1	0	3	0	0	0	0
0	0	0	0	1	0	333.33	0	2	0	0	1	0	0	0	0	1	0
0	0	0	0	0	5	173.90	5	9	0	1	5	3	10	0	2	1	2
0	0	0	0	0	0	......	1	1	0	2	0	2	1	1	1	1	2
1	0	0	0	9	1	407.40	2	3	0	2	1	1	1	0	0	3	3
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	1	222.22	2	1	0	0	1	1	2	0	0	0	0
0	0	0	0	1	0	166.67	1	2	0	0	0	2	1	2	1	0	2
0	0	0	0	1	0	100.00	0	1	0	2	1	2	1	0	0	2	0
1	0	0	2	3	4	114.30	23	30	1	11	9	16	40	6	7	18	34
17	....	....	8	112	13	213.60	105	130	5	81	41	91	81	30	38	103	78
7	0	0	1	33	2	280.18	33	24	1	20	9	30	10	8	4	9	1
2	0	0	1	5	0	205.10	6	3	0	5	2	1	0	2	1	0	11
2	0	0	5	8	6	207.15	23	19	0	15	4	8	7	6	1	11	16
0	0	0	0	3	0	125.00	7	2	0	2	2	0	4	1	1	0	2
0	0	0	0	6	0	466.67	2	1	0	0	0	0	1	0	1	1	2
0	0	0	0	2	0	111.11	2	3	0	2	1	0	5	1	0	2	0
0	0	0	0	3	0	600.00	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	214.75	2	3	0	1	0	1	0	0	0	0	4
0	0	0	0	0	0	250.00	0	1	0	0	0	0	0	1	0	1	0
0	0	0	1	0	0	285.71	0	1	0	0	0	3	1	0	0	0	0
1	0	0	0	4	0	333.33	1	1	0	1	3	0	1	0	3	2	2
0	0	0	0	14	1	439.00	2	7	1	3	3	3	2	0	0	2	0
0	0	0	0	0	0	......	1	0	0	0	0	1	0	0	0	1	0
1	0	0	0	0	0	111.11	1	3	0	1	0	0	1	0	1	1	0
0	0	0	0	1	0	125.00	2	0	0	1	0	0	1	0	0	3	0
0	0	0	0	1	0	250.00	0	2	0	1	0	0	1	1	0	1	0
1	0	0	0	0	0	64.50	2	6	0	0	3	4	6	1	0	5	2
0	0	0	0	1	0	71.43	1	3	0	0	1	1	1	0	3	0	3
0	0	0	0	0	0	......	1	2	0	1	0	1	0	0	0	0	0
0	0	0	0	1	0	35.60	4	5	1	3	1	3	1	2	0	3	4
1	0	0	0	1	0	166.67	1	1	0	1	0	1	1	0	3	1	6
0	0	0	0	8	0	276.80	0	6	0	1	0	1	3	0	3	4	3
0	0	0	0	0	0	82.50	0	2	1	0	1	0	1	0	1	3	2
0	0	0	0	9	0	450.00	3	1	0	2	0	0	3	0	1	0	1
0	0	0	0	1	0	100.00	0	0	1	0	0	1	3	0	1	3	0
2	0	0	0	11	4	116.00	11	34	0	21	11	32	27	7	14	49	19

[illegible]	Population	Total number of deaths	Corresponding annual death rate per 1,000	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro-spinal fever	Typhus fever	Typhoid fever	Malarial diseases	Small-pox
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

OCTOBER — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
1	....	1	3	16	11	162.05	21	36	....	25	14	25	36	10	13	40	21
0	0	0	0	0	0	125.00	0	1	0	0	1	1	0	0	0	1	3
0	0	0	0	0	0	125.00	1	1	0	2	1	1	0	1	0	0	0
0	0	0	0	0	0	200.00	0	0	0	1	0	1	0	1	0	1	0
0	0	0	0	0	0	......	0	0	0	2	1	1	2	0	0	0	0
0	0	0	0	2	1	250.00	1	2	0	4	0	1	1	1	1	0	0
0	0	0	0	2	1	250.00	2	2	0	2	0	1	2	0	0	0	0
0	0	0	0	1	0	285.71	0	1	0	2	0	0	1	0	0	1	0
0	0	0	0	1	3	266.67	1	3	0	0	1	0	1	0	1	2	2
0	0	0	0	0	0	142.85	0	1	0	1	0	1	1	0	0	2	0
0	0	0	0	0	0	......	1	2	0	0	0	1	0	0	0	0	2
0	0	0	1	1	0	166.67	0	3	0	0	0	1	3	1	0	2	0
0	0	0	0	0	0	......	0	0	0	1	0	1	0	0	0	0	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	1	0	1	0	0	0	0
1	0	1	2	9	6	155.50	15	20	0	12	9	15	24	6	11	30	11
2	1	....	3	42	18	205.00	35	39	6	35	14	36	41	13	18	53	34
1	0	0	0	9	1	366.67	4	2	0	4	0	2	2	0	0	1	4
0	0	0	0	0	0	......	0	0	0	1	0	1	0	0	1	0	0
0	0	0	0	0	0	......	1	0	0	2	1	1	1	0	0	1	0
0	0	0	0	9	1	370.37	1	0	0	1	1	2	5	1	3	1	2
0	1	0	1	0	0	222.22	1	2	0	1	0	1	2	0	0	0	0
0	0	0	0	1	1	125.00	2	3	1	0	0	1	4	1	1	0	1
0	0	0	0	4	1	......	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	......	0	3	0	0	0	1	1	0	0	0	0
1	0	0	1	5	4	181.81	10	7	1	4	4	10	6	2	3	5	2
0	0	0	0	0	0	......	2	0	0	0	0	0	1	0	0	2	1
0	0	0	0	7	1	317.30	1	1	0	3	1	1	3	0	1	2	1
0	0	0	0	0	1	400.00	1	0	0	1	0	0	0	1	0	0	0
0	0	0	0	0	0	200.00	1	0	1	0	0	0	0	0	0	1	1
0	0	0	0	0	1	285.71	1	0	0	1	0	0	0	0	0	1	2
0	0	0	0	0	1	200.00	0	0	0	0	0	0	2	0	0	0	1
0	0	0	0	4	0	300.00	0	5	0	1	1	1	2	0	0	3	1
0	0	0	1	3	6	108.50	10	16	3	16	6	15	12	8	9	36	17
2	....	1	2	23	7	197.50	36	26	1	26	7	21	47	14	16	38	28
1	0	0	1	1	1	272.73	8	5	1	1	2	3	7	1	0	2	2
0	0	0	0	0	0	......	0	1	0	2	0	0	1	0	2	1	0
0	0	0	0	0	0	250.00	0	0	0	0	0	0	0	1	0	1	1
0	0	0	0	0	0	......	0	0	0	1	0	0	1	0	0	0	1
1	0	0	0	8	2	267.50	4	5	0	4	1	3	4	0	2	9	9
0	0	0	0	1	0	333.33	1	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	1	0
0	0	0	0	3	0	300.00	1	0	0	0	0	1	2	0	0	3	0
0	0	0	0	0	0	......	0	1	0	1	0	1	1	0	1	0	0
0	0	1	0	0	0	230.77	2	2	0	1	0	1	1	1	2	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	1	0
0	0	0	0	0	0	200.00	0	1	0	0	0	1	0	2	0	0	0
0	0	0	1	10	4	164.70	19	11	0	16	4	11	28	8	9	20	15
2	....	....	1	31	15	180.00	32	44	4	28	12	46	49	10	15	50	24
0	0	0	0	0	0	333.33	1	1	0	0	0	1	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	0

[illegible table]

* [illegible] weeks

[illegible] cities and towns [illegible] in the winter months. [illegible] were from this cause. [illegible] of the deaths [illegible] per

Note.—For boundaries of Sanitary

OCTOBER — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	......	1	0	0	1	0	0	0	0	0	0	0
0	0	0	0	8	0	473.70	1	0	0	1	1	2	3	0	0	0	2
0	0	0	0	1	0	250.00	0	1	0	1	0	1	1	0	1	1	0
0	0	0	0	2	2	363.64	1	1	0	0	0	0	1	1	0	2	1
0	0	0	0	1	0	666.66	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	1	200.00	0	0	0	1	0	0	2	1	1	2	1
0	0	0	0	0	0	......	0	0	0	0	0	1	2	1	0	2	0
0	0	0	0	0	0	......	1	1	0	1	0	0	0	0	0	1	0
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	0	1	0
2	0	0	1	6	10	219.30	14	16	3	2	3	11	23	3	6	7	1
0	0	0	0	0	0	83.33	1	0	0	0	0	5	3	0	0	2	0
0	0	0	0	0	0	......	1	1	0	1	1	0	0	0	0	0	2
0	0	0	0	13	2	144.25	11	22	1	20	7	25	12	4	7	30	17
1	....	....	3	9	9	191.67	10	21	2	19	9	30	31	6	17	35	14
0	0	0	0	1	1	115.38	0	5	1	2	1	2	4	2	2	3	1
0	0	0	0	3	1	384.60	1	1	0	1	0	1	1	0	1	2	0
0	0	0	0	0	0	166.67	0	1	1	1	0	0	1	0	0	1	0
0	0	0	0	0	0	......	1	1	0	1	0	2	1	0	0	0	1
0	0	0	0	1	0	200.00	0	1	0	1	1	0	0	0	1	0	0
0	0	0	0	0	0	333.33	0	1	0	0	1	0	1	0	0	1	0
0	0	0	0	0	0	......	1	0	0	0	0	0	2	0	0	1	1
0	0	0	0	0	0	500.00	0	0	0	0	0	1	0	0	1	1	0
0	0	0	0	0	0	333.33	1	0	0	1	0	0	0	0	0	0	0
1	0	0	3	4	7	184.00	6	11	0	12	6	24	21	4	12	26	11
6	1	1	4	31	46	170.00	70	75	12	54	31	61	115	32	36	53	122
0	0	0	0	1	1	83.83	2	4	0	1	1	3	2	2	2	2	3
0	0	0	0	0	1	91.90	0	1	0	0	1	2	3	0	0	2	1
0	0	0	0	0	0	......	0	0	0	1	0	1	0	1	0	0	1
0	0	0	0	0	0	......	0	1	0	0	1	1	0	2	2	2	1
0	0	0	0	0	0	......	0	1	0	1	0	0	1	0	2	1	0
0	0	0	0	0	0	......	0	0	0	1	1	0	1	0	0	2	2
0	0	0	1	7	5	149.32	24	25	2	6	11	10	21	6	5	9	12
0	0	0	0	0	0	......	1	0	0	0	0	0	0	1	0	1	2
1	0	0	1	0	0	285.71	0	0	0	0	1	1	2	0	0	0	1
0	0	0	0	0	0	......	0	1	0	0	0	1	1	0	0	2	1
0	0	0	0	0	1	222.22	2	0	0	0	0	2	0	0	2	1	0
0	0	0	0	0	0	142.85	0	1	0	0	0	0	0	0	2	3	0
4	1	0	2	23	25	208.10	29	28	6	27	11	22	54	9	15	3	79
0	0	0	0	0	1	444.44	0	1	0	2	0	1	4	0	2	1	3
0	0	0	0	6	0	......	0	0	0	0	0	0	1	0	0	1	0
1	0	1	0	0	12	153.00	12	12	4	15	4	17	25	11	4	23	16
57	7	13	70	570	339	177.00	959	1,016	64	557	431	595	899	238	343	491	1,032
125	43	19	102	432	386	196.37	1,031	1,034	70	518	392	495	791	232	278	512	984

ending October 26.

specified, the population of which is 4,015,000, giving an annual death rate for them per the former (urban) class, 31.67 per cent, and of the latter (rural) class 14.33 per cent of the cent of the latter class were from zymotic diseases. The mortality from diphtheria has numerous epidemics have occurred, and the number of localities is much increased; Typhoid fever varies little: it caused 2.80 per cent of the *urban* and 5.18 per cent of the 1,000 above the age of five years.

Districts, see Annual Summary.

[illegible]	Population	Total number of deaths	Representing annual death rate per 1,000 of [illegible]	Deaths under five years	Percentage of deaths under five years to total deaths	Cerebro-spinal fever	Typhus fever	Typhoid fever	Malarial diseases
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during November, 1889.

populations preceded by a star (*) are estimated to date; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
30	21	17	40	289	76	140.14	744	622	35	248	307	331	452	101	172	110	594
17	18	12	28	122	57	124.13	437	384	21	138	196	194	256	70	128	45	396
13	0	3	6	134	9	158.20	254	174	8	70	78	99	147	21	33	37	149
0	0	0	0	0	0	166.67	2	1	0	0	0	0	1	0	1	0	0
0	2	0	1	14	1	322.00	8	2	0	4	4	5	3	1	2	3	7
0	0	0	0	2	0	......	1	0	0	0	0	2	0	0	0	1	1
0	0	0	0	0	0	52.60	4	4	1	1	3	1	0	0	0	0	4
0	0	0	0	0	1	......	0	2	0	0	1	1	0	0	0	0	2
0	0	0	0	0	0	......	1	0	0	0	3	0	2	0	1	0	1
0	0	0	0	0	0	......	1	0	0	2	0	1	0	1	1	1	1
0	0	0	0	0	0	......	1	1	0	0	0	0	3	0	0	2	0
0	0	0	0	1	0	333.33	0	0	0	0	2	0	0	0	1	1	0
0	0	0	0	0	0	......	2	0	0	0	0	0	0	0	0	1	1
0	0	1	0	3	0	172.85	1	6	0	5	4	3	3	1	0	2	4
0	0	0	0	1	0	66.67	2	4	1	1	0	3	1	0	0	0	2
0	0	0	0	0	0	......	0	1	0	0	1	1	1	0	0	1	0
0	0	0	0	0	0	......	1	3	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	2	3	0	2	2	1	3	1	0	1	5
0	0	0	1	0	0	191.92	2	1	0	0	2	0	3	0	0	1	0
0	0	0	0	4	0	307.70	0	0	0	1	0	2	2	1	1	0	0
0	0	1	0	2	0	571.42	0	0	0	2	0	0	1	0	0	0	0
0	0	0	0	0	0	......	* 0	4	0	1	1	0	0	1	0	0	0
0	0	0	1	0	0	400.00	0	1	0	0	0	0	1	0	0	0	1
0	0	0	0	1	0	111.17	0	0	0	0	1	3	0	0	0	2	2
0	0	0	3	5	8	126.31	25	29	4	21	9	14	25	4	4	12	18
1	1	1	2	91	8	161.29	101	91	1	52	41	73	92	20	31	71	57
3	0	0	0	13	2	164.45	30	14	0	13	12	27	13	4	6	5	3
0	1	0	0	2	0	129.00	5	3	0	1	1	3	8	1	0	0	5
2	0	0	1	13	2	210.00	11	16	0	7	1	7	10	4	1	9	13
0	1	0	0	4	0	285.71	2	1	0	0	3	0	2	0	0	0	2
0	0	0	0	9	1	416.67	1	5	0	2	0	1	3	0	0	1	1
0	0	0	0	3	0	222.22	1	3	0	1	0	2	2	0	0	4	1
0	0	0	0	2	0	200.00	4	2	0	0	1	0	0	0	0	0	1
0	0	0	0	1	0	400 00	1	2	0	0	0	1	0	1	1	0	0
2	0	0	0	0	0	400.00	0	1	0	0	0	0	1	0	0	1	0
0	0	0	1	1	0	285.71	0	0	0	0	2	2	0	0	0	0	1
0	0	0	0	5	1	315.79	5	0	0	1	1	1	1	0	0	2	2
0	0	0	0	12	0	350.00	1	2	0	4	1	6	6	1	1	2	0
0	0	0	0	0	0	333.33	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	333.33	0	1	0	0	0	1	1	0	0	1	0
0	0	0	0	0	0	......	1	0	0	1	0	0	2	0	0	1	0
0	0	0	0	1	0	166.67	1	0	0	0	0	0	1	2	0	0	1
0	0	1	0	1	0	71.43	3	5	0	0	3	5	2	2	2	1	3
0	0	0	0	1	0	91.90	0	1	0	3	1	0	3	0	1	1	0
0	0	0	0	0	0		1	0	0	0	1	2	0	1	0	9	1
0	0	0	0	1	0	55.55	4	2	0	1	2	0	5	0	0	3	0
1	0	0	0	0	0	333.33	0	1	0	0	0	0	0	0	3	1	5
0	0	0	0	11	0	478.25	2	3	0	0	1	0	3	0	1	1	1
0	0	0	0	0	0	111.11	0	0	0	1	1	1	2	1	2	0	0
0	0	0	0	4	1	250.00	2	0	0	1	1	2	1	0	2	3	3
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	1	1
6	0	0	0	0	0	......	2	1	0	0	1	0	0	0	0	3	1
3	0	0	0	6	1	81.10	24	28	1	15	7	12	26	3	11	31	12

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
ADIRONDACK & NORTHERN DISTRICT:										
Totals	....	227	......	46	20.2	1	....	6	....	....
Argyle	3,700	1	....	0	....	0	0	0	0	0
Greenwich	*4,000	4	12.00	0	....	0	0	0	0	0
Salem	3,500	3	10.28	0	....	0	0	0	0	0
Fort Ann	4,267	3	......	1	33.3	0	0	0	0	0
Fort Edward	4,880	4	10.00	0	....	0	0	0	0	0
Glens Falls	*10,000	8	9 60	0	....	0	0	0	0	0
Malone	*9,000	10	13.33	1	10.0	0	0	0	0	0
Potsdam	*4,000	3	9.00	0	....	0	0	0	0	0
OGDENSBURGH	*12,000	18	18.00	3	16.7	0	0	1	0	0
Gouverneur	*5,500	10	21.88	1	10.0	0	0	1	0	0
Ellisburgh	4,811	3	......	0	....	0	0	0	0	0
Plattsburgh	*7,000	4	6.85	3	75.0	0	0	0	0	0
WATERTOWN	*12,200	16	15.80	6	37.5	0	0	1	0	0
Cape Vincent	3,143	3	11.46	1	33.3	0	0	0	0	0
Lowville	3,188	2	7.50	1	50.0	0	0	0	0	0
Clayton	4,314	2	......	0	....	0	0	0	0	0
Rest of district	....	133	......	29	21.8	1	0	3	0	0
MOHAWK VALLEY DIST.:										
Totals	....	386	......	66	17.1	....	....	8	....	....
SCHENECTADY	*20,000	33	19.80	3	9.0	0	0	1	0	0
Schoharie	3,350	2	7.16	0	....	0	0	1	0	0
Cobleskill	3,371	3	10.60	0	....	0	0	0	0	0
AMSTERDAM	*20,000	28	16.80	7	25.0	0	0	0	0	0
Johnstown	*6,000	6	12.00	1	16.7	0	0	0	6	0
Gloversville	*10,000	13	15.60	5	38.4	0	0	0	0	0
Little Falls	8,500	10	14.12	3	30.0	0	0	0	0	0
Ilion	*4,200	2	5.71	0	....	0	0	0	0	0
UTICA	*40,000	80	24.00	17	21.3	0	0	3	0	0
Whitestown	*5,000	5	12.00	0	....	0	0	0	0	0
ROME	12,045	23	23.00	8	34.7	0	0	0	0	0
Boonville	*4,000	4	12.00	0	..	0	0	0	0	0
Waterford	*5,400	11	24.44	2	18.2	0	0	0	0	0
Ballston Spa	3,200	2	7.50	1	50.0	0	0	0	0	0
Saratoga Springs	*10,000	24	28.80	3	12.5	0	0	1	0	0
Rest of district	....	140	......	16	11.4	0	0	2	0	0
SOUTHERN TIER DIST.:										
Totals	....	251	......	37	14.7	1	....	13	2	....
BINGHAMTON	*30,000	36	14.40	5	14.0	0	0	4	1	0
Candor	4,323	3	......	0	....	0	0	0	0	0
ELMIRA	*25,000	38	18.24	12	31.6	0	0	0	1	0
Horseheads	3,500	2	7.00	1	50.0	0	0	0	0	0
Bath	3,500	5	17.14	0	....	0	0	1	0	0
Olean	*8,000	11	16.50	2	18.2	1	0	1	0	0
Salamanca	*6,000	2	......	1		0	0	0	0	0
JAMESTOWN	*14,000	21	18.00	3	14.3	0	0	3	0	0
Westfield	3,000	3	12.00	0	....	0	0	0	0	0
Fredonia	*3,000	3	12.00	0	..	0	0	0	0	0
Rest of district	....	127	......	13	10.5	0	0	4	0	0
EAST CENTRAL DIST.:										
Totals	....	331	......	47	14.2	....	....	13	5	0
Walton	3,540	4	13.56	0	....	0	0	0	0	0
Delhi	3,000	2	8.00	0	....	0	0	0	0	0

NOVEMBER — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
1	1	....	2	7	2	88.25	30	25	3	12	13	20	35	6	5	38	20
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	1	0	0	2	0	0	0	1	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	1	0	2
0	0	0	0	0	0	......	1	0	0	0	1	0	1	0	0	1	0
0	0	0	0	0	0	......	2	0	0	0	1	1	2	1	0	1	0
0	0	0	0	0	0	......	1	0	0	0	1	4	0	0	0	3	1
0	0	0	0	0	0	......	0	0	0	0	1	0	1	0	0	0	1
0	0	0	0	0	0	55.55	6	2	0	1	0	2	3	0	0	1	2
0	0	0	0	1	0	200.00	0	0	0	0	0	2	1	2	1	1	1
0	0	0	0	0	0	......	0	0	0	1	0	0	0	1	0	1	0
0	0	0	0	0	0	......	2	0	0	0	0	0	0	0	0	1	1
0	0	0	1	5	0	437.50	0	1	1	1	0	0	3	0	0	2	1
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	1	0	0
0	0	0	0	0	0	......	0	1	0	0	0	0	1	0	0	0	0
1	1	0	0	1	2	75.18	17	19	2	9	7	11	21	2	1	25	9
....	...	....	2	40	2	134.71	52	34	5	23	29	31	58	14	22	37	29
0	0	0	0	6	0	212.12	2	5	0	0	4	3	7	0	2	1	2
0	0	0	0	0	0	500.00	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0		0	1	0	0	0	1	0	1	0	0	0
0	0	0	0	8	0	285.71	3	2	0	0	2	4	6	1	0	2	0
0	0	0	0	0	0	......	1	1	0	0	0	1	3	0	0	0	0
0	0	0	0	0	0	......	5	1	0	0	3	0	1	0	0	0	3
0	0	0	0	2	0	200.00	3	0	0	0	0	0	1	1	2	0	1
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	1	0
0	0	0	1	5	2	137.50	10	8	2	6	7	3	16	2	5	5	5
0	0	0	0	0	0	200.00	0	1	0	1	1	1	0	0	0	0	0
0	0	0	1	7	0	304.34	3	2	0	1	0	2	3	3	0	0	2
0	0	0	0	0	0	......	0	0	0	0	7	0	1	0	0	1	0
0	0	0	0	1	0	181.82	5	0	0	1	0	1	0	0	0	0	3
0	0	0	0	0	0	......	0	0	0	0	0	0	1	1	0	0	0
0	0	0	0	3	0	166.67	3	3	0	3	1	0	4	1	3	1	1
0	0	0	0	8	0	71.43	17	10	3	11	8	15	15	4	10	25	12
2	....	....	2	24	3	187.40	27	23	7	17	11	27	26	10	14	26	16
0	0	0	0	1	0	166.67	7	3	2	2	1	1	4	2	3	2	3
0	0	0	0	0	0	......	0	0	0	0	0	3	0	0	0	0	0
2	0	0	2	13	1	500.00	3	2	0	0	1	2	6	1	1	1	2
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	200.00	0	1	0	0	0	0	2	0	0	1	0
0	0	0	0	0	0	181.82	0	0	1	1	0	1	2	0	1	1	2
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	1	0	0
0	0	0	0	1	0	190.50	4	1	2	2	0	2	3	1	0	1	1
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	2	0
0	0	0	0	0	0	......	0	1	0	0	0	0	0	0	0	0	2
0	0	0	0	9	2	115.00	12	15	2	12	8	18	9	6	8	17	5
4	...	1	....	11	3	115.15	44	42	6	27	14	29	40	12	12	57	11
0	0	0	0	0	0	......	1	3	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	1	0

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of –	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
EAST CENT. DIST.—(*Cont.*)										
Oneonta	*7,000	6	10.30	0	....	0	0	1	0	0
Worcester	*3,000	0	......	0	....	0	0	0	0	0
Cazenovia	4,363	6	16.52	0	....	0	0	0	0	0
Brookfield	3,685	8	9.78	0	...	0	0	0	0	0
Norwich	5,500	9	19.64	0	....	0	0	3	0	0
Hamilton	3,912	2	......	1	50.0	0	0	0	0	0
Oneida	*5,000	6	14.40	0		0	0	0	1	0
SYRACUSE	*80,000	120	18.00	27	22.5	0	0	1	1	0
Cortland	*9,000	16	21.33	1	6.2	0	0	1	0	0
Homer	3,000	2	8.00	0	....	0	0	1	0	0
Rest of district	....	155	......	18	11.6	0	0	6	3	4
WEST CENTRAL DIST.:										
Totals	....	254	......	30	12.0	....	....	7	4	....
AUBURN	*26,000	42	21.00	5	12.0	0	0	0	2	0
Ithaca	*10,000	11	13.20	1	9.1	0	0	0	0	0
Waterloo	*4,500	6	16 00	2	33.3	0	0	2	0	0
Seneca Falls	*6,000	5	10.00	0	....	0	0	0	0	0
Manchester	*4,000	3	9.00	0	....	0	0	0	0	0
Phelps	*7,000	6	10.29	0	....	0	0	1	0	0
Canandaigua	*6,300	6	11.43	1	16.7	0	0	0	0	0
Geneva	*6,000	12	24.00	1	8.3	0	0	0	0	0
Penn Yan	*4,500	2	......	0	....	0	0	0	0	0
Batavia	*7,000	4	......	0	....	0	0	0	0	0
Rest of district	....	157	......	20	12.5	0	0	4	2	0
LAKE ONTARIO AND WESTERN DISTRICT:										
Totals	....	751	......	229	30.5	7	....	31	3	....
OSWEGO	*24,000	18	9.00	4	22.2	0	0	2	0	0
Richland	4,000	2	6.00	0	....	0	0	0	0	0
Clyde	*3,000	3	12.00	1	33.3	0	0	0	0	0
Lyons	*6,000	6	12.00	1	16.7	0	0	0	0	0
Palmyra	*4,800	1	......	0	...	0	0	0	0	0
ROCHESTER	*130,000	140	12.92	41	29.0	0	0	3	1	0
Brockport	4,500	2	......	0	....	0	0	0	0	0
Medina	4,000	3	9 00	1	33.3	0	0	1	0	0
Albion	*5,000	7	16.80	0	....	0	0	2	0	0
LOCKPORT	*15,000	8	......	0	....	0	0	0	0	0
Niagara	*7,000	3	......	0	....	0	0	0	0	0
BUFFALO	*230,000	†389	17.58	154	39.5	6	0	10	1	0
Tonawanda	5,000	7	9.80	2	28.5	0	0	4	0	0
Amherst	4,578	2	......	0	....	0	0	0	0	0
Rest of district	....	160	......	25	15.6	1	0	9	1	0
Totals for the State	....	7,285	......	2,025	27.7	21	....	169	63	....
Totals for Nov., 1888	....	6,987	......	2,111	30.2	21	....	153	61	8

† For five weeks

REMARKS.—In 125 cities, villages and large towns, having an aggregate population of
per 1,000 of 18.06. In the infant mortality there is little variation from that of last
that of November, 1888. This diminution is due to fewer deaths from typhoid fever.
month, and 3.24 per cent last month: about the same variation occurred in 1888. Diph-
off to 6.86 instead of continuing to increase; it is reported from but twenty rural towns
little variation in other zymotic diseases. In each 1,000 deaths there were 129.51 from

NOTE.—For boundaries of Sanitary

NOVEMBER — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	166.67	1	0	0	0	1	0	0	1	1	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	1	1	0	0	1	0	1	0	0	2	0
0	0	0	0	0	0	..	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	333.33	0	2	0	0	0	0	1	2	1	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	2	1	0	0	0	0	2	0
4	0	1	0	4	2	108.34	19	15	4	6	2	13	20	7	6	14	1
0	0	0	0	0	0	62.50	5	2	0	3	1	1	0	0	0	0	3
0	0	0	0	0	0	500.00	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	5	1	96.80	17	19	2	14	8	15	16	2	4	36	7
2	...	....	2	12	2	117.00	23	26	2	16	14	28	24	16	14	35	27
0	0	0	0	1	2	119.05	5	8	0	1	3	11	2	2	0	1	4
1	0	0	0	1	0	181 80	1	1	1	1	0	1	0	2	0	1	1
0	0	0	0	0	0	333.33	0	0	0	0	0	1	1	0	0	0	2
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	1	1	1
0	0	0	0	0	0	......	1	0	0	1	0	0	0	0	0	1	0
0	0	0	0	0	0	166.67	0	2	0	0	1	1	0	0	0	1	0
0	0	0	0	0	0	......	1	1	0	0	0	0	2	0	1	1	0
0	0	0	0	0	0	......	1	1	1	2	0	2	1	0	2	1	1
0	0	0	0	0	0	....	0	1	0	0	0	0	0	1	0	0	0
0	0	0	1	0	0	250.00	1	0	0	0	0	0	0	0	0	2	0
1	0	0	1	10	0	112.50	12	11	0	11	10	12	18	11	10	26	18
6	2	2	5	27	14	129.33	112	81	8	55	23	60	95	20	41	45	114
0	0	0	0	0	0	111.11	1	3	0	3	0	2	1	0	3	0	3
0	0	0	0	0	0	......	0	0	0	0	0	2	0	0	0	0	0
0	0	0	0	0	0	.....	0	1	0	0	0	0	1	0	0	0	1
0	0	1	0	0	0	166.67	0	2	0	0	0	1	0	0	1	0	1
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	3	3	71.40	29	18	2	11	5	9	23	3	4	12	14
0	0	0	0	0	0	......	0	0	0	0	0	1	0	1	0	0	0
0	0	0	0	0	0	333.33	0	0	0	0	0	1	0	0	0	0	1
0	0	0	0	0	0	......	0	1	0	0	0	0	1	1	0	2	0
0	0	0	0	1	0	125.00	4	2	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0		0	0	0	0	0	0	0	0	1	1	1
4	1	1	5	23	7	125.64	59	40	4	29	10	30	56	7	21	0	75
0	0	0	0	0	0	571.43	1	0	0	0	0	1	0	0	0	0	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	2	0
2	1	0	0	0	4	112.50	18	14	2	11	8	13	13	8	10	28	17
56	25	21	55	501	110	139.60	1,133	944	67	450	452	599	822	199	311	419	868
171	52	16	90	538	112	174.88	1,051	893	58	414	398	522	796	164	300	443	726

ending November 30.

4,012,000, there were during November 6,039 deaths, representing an annual death rate
month. The zymotic death rate is materially less than that of last month and also than
diphtheria and diarrhœa. Typhoid fever caused 2.32 per cent of the mortality this
theria, which increased greatly in October, causing 7.12 per cent of all deaths, has fallen
not enumerated in the Bulletin. Diarrhœa shows the customary decrease. There is
consumption and 179.46 per 1,000 above five years of age.

Districts, see Annual Summary.

MONTHLY BULLETIN OF THE NEW

Abstract of reports of deaths and their causes in the

[Cities are printed in SMALL CAPITALS, villages in *italics*, and towns in Roman type. The census

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of—	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
MARITIME DISTRICT: Totals	....	5,404	......	1,635	30.4	9	..	46	27	..
NEW YORK CITY	*1,571,558	3,319	24.86	1,006	30.3	8	0	21	16	0
BROOKLYN	*821,525	1,580	22.64	504	31.9	0	0	18	11	0
Gravesend	*5,000	6	14.40	1	16.7	0	0	0	0	0
New Utrecht	*5,000	8	19.20	2	25.0	0	0	0	0	0
LONG ISLAND CITY	*40,000	17	......	9	....	0	0	0	0	0
Flatbush	*8,000	16	24.00	2	12.5	0	0	0	0	0
Newtown	*10,000	19	22.80	10	52.6	0	0	0	0	0
Oyster Bay	*12,000	13	......	3	....	0	0	0	0	0
Hempstead	18,160	13	.....	3	....	0	0	0	0	0
North Hempstead	8,000	5	7.50	1	20.0	0	0	0	0	0
Huntington	8,100	12	17.78	4	25.0	0	0	0	0	0
Southold	7,267	6	......	1	16.7	0	0	1	0	0
Sag Harbor	*3,000	6	24.00	4	66.7	1	0	1	0	0
New Brighton	*15,000	14	......	5	....	0	0	0	0	0
Edgewater	12,000	21	21.00	4	19.0	0	0	0	0	0
Westfield	7,000	6	10.30	2	33.3	0	0	0	0	0
YONKERS	*30,000	49	19.60	17	34.7	0	0	0	0	0
Westchester	*7,000	9	15.43	3	33.3	0	0	0	0	0
Mount Vernon	*11,000	17	18.55	8	47.0	0	0	0	0	0
Port Chester	*4,000	4	12.00	0	....	0	0	0	0	0
Sing Sing	*6,500	11	20.30	1	9.1	0	0	0	0	0
New Rochelle	*5,500	11	24.00	3	27.3	0	0	0	0	0
Peekskill	*7,000	11	18.85	4	36.4	0	0	0	0	0
Rest of district	....	231	......	38	18.0	0	0	5	0	0
HUDSON VALLEY DIST.: Totals	....	900	......	240	26.7	6	..	18	9	..
ALBANY	*103,000	199	23.18	65	32.5	1	0	7	0	0
COHOES	*20,000	30	18.00	18	60.0	0	0	1	0	0
TROY	*65,000	112	20.61	31	27.8	2	0	3	0	0
West Troy	*13,000	27	24.92	11	40.7	0	0	1	0	0
Hoosick Falls	*6,000	9	18.00	3	33.3	0	0	0	0	0
Lansingburgh	*10,000	19	21.80	7	36.9	1	0	0	0	0
Green Island	*5,000	9	21.30	5	55.5	0	0	0	0	0
Greenbush	*8,000	12	18.00	3	25.0	0	0	0	0	0
Coxsackie	4,000	7	21.00	0	....	0	0	0	0	0
Catskill	*4,500	6	16.00	0	....	0	0	0	0	0
HUDSON	*10,000	19	21.80	10	52.6	0	0	0	0	0
KINGSTON	*21,000	42	24.00	13	30.9	1	0	0	1	0
Ellenville	3,000	4	16.00	0	....	0	0	0	0	0
Marbletown	4,000	4	12.00	1	25.0	0	0	0	0	0
Esopus	4,736	7	17.76	1	14.3	0	0	0	1	0
Saugerties	*4,000	6	18.00	1	16.7	0	0	1	0	0
POUGHKEEPSIE	*20,200	27	16.08	4	14.7	0	0	0	0	0
Fishkill	10,732	14	......	4	....	0	0	0	0	0
Wappinger Falls	*5,000	3	7.20	0	....	0	0	0	0	0
NEWBURGH	*20,000	43	25.65	10	23.2	0	0	1	0	0
Port Jervis	*9,500	14	12.00	2	14.3	0	0	0	0	0
MIDDLETOWN	*10,000	19	21.80	3	15.9	0	0	0	0	0
Goshen	4,500	9	24.00	1	11.1	0	0	0	0	0
Haverstraw	*7,000	16	27.42	4	25.0	0	0	0	0	0
Nyack	*5,000	3	......	1	33.3	0	0	0	0	0

YORK STATE BOARD OF HEALTH.

following districts, cities and towns, during December, 1889.

populations preceded by a star (*) are estimated to date ; the remainder are from the of 1880.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
44	26	14	52	331	84	117.20	1,216	780	50	274	347	381	592	134	156	130	711
30	23	10	33	157	67	109.64	790	520	24	150	232	227	308	79	95	52	477
11	3	3	14	158	11	144.93	350	186	24	86	84	117	196	44	49	35	180
0	0	0	0	0	0	......	2	0	0	0	0	1	2	0	0	1	0
0	0	0	1	0	0	125.00	1	2	0	1	0	1	1	0	1	0	0
0	0	0	3	3	0	......	2	2	0	1	1	1	0	1	1	0	2
0	0	0	0	4	0	250.00	2	0	0	4	0	1	5	0	0	0	0
0	0	0	0	1	0	52.60	4	2	1	0	1	2	2	0	0	1	5
0	0	0	0	0	0	......	2	0	0	1	3	0	1	3	1	2	0
0	0	0	0	1	0	......	2	2	0	2	2	1	1	0	0	1	1
0	0	0	0	0	0	......	1	1	0	0	2	1	0	0	0	0	0
0	0	0	0	0	0	......	0	2	0	3	0	1	0	0	0	3	3
0	0	0	0	1	0	333.33	1	0	0	0	1	0	1	0	0	0	0
0	0	0	0	0	0	333.33	0	1	0	0	0	0	1	1	0	1	0
0	0	0	0	0	0	......	2	1	0	3	1	1	3	1	0	0	2
0	0	0	0	0	0	......	5	4	0	1	1	1	2	1	2	2	2
0	0	0	0	1	1	333.33	0	1	0	2	0	0	0	0	0	1	0
3	0	0	0	1	1	102.05	10	8	1	2	6	3	7	0	1	0	6
0	0	0	0	0	0	......	1	3	0	1	0	0	2	0	1	0	1
0	0	0	0	1	0	58.82	5	2	0	2	0	0	2	0	0	2	3
0	0	0	0	0	0	......	2	1	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	1	4	0	2	0	1	1	0	0	0	2
0	0	0	0	0	0	......	2	0	0	1	2	1	5	0	0	0	0
0	0	0	0	0	0	......	2	1	0	1	0	1	2	0	0	1	3
0	0	1	1	3	4	60.00	28	37	0	11	11	19	50	4	5	28	24
14	....	3	7	80	5	157.78	139	119	9	58	32	91	112	21	30	67	80
5	0	1	2	17	0	165.15	26	30	2	11	8	36	26	4	8	8	7
2	0	0	0	3	0	200.00	6	4	0	3	1	1	4	0	0	1	4
1	0	0	2	10	0	160.71	27	12	0	5	3	13	14	2	5	4	9
0	0	0	0	4	1	222.22	6	3	0	1	1	0	6	0	0	0	4
0	0	0	0	1	0	111.11	0	4	0	1	0	1	0	0	0	0	2
0	0	0	0	3	1	263.16	3	3	0	2	1	0	3	0	0	1	1
0	0	1	3	0	0	444.44	1	1	0	0	0	0	1	0	0	1	1
1	0	0	0	1	1	250.00	1	0	0	1	0	4	2	0	0	0	1
0	0	0	0	0	0	......	1	1	1	0	0	0	2	0	1	1	0
0	0	0	0	0	0	......	1	0	0	0	0	1	4	0	0	0	0
1	0	0	0	6	0	368.42	5	1	0	0	0	0	0	1	0	2	3
0	0	0	0	12	0	333.33	6	6	1	3	3	4	2	1	0	2	0
0	0	0	0	0	0	......	1	1	0	0	0	0	0	2	0	0	0
0	0	0	0	0	0	......	1	2	0	0	0	1	0	0	0	0	0
0	0	0	0	2	0	428.50	2	0	0	0	0	1	0	1	0	0	0
0	0	0	0	0	0	166.69	0	1	1	0	0	0	0	0	0	1	2
0	0	0	0	1	0	36.75	2	2	0	4	0	4	4	2	0	4	4
0	0	0	0	4	0	......	1	3	0	1	1	0	1	0	1	0	2
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	0	0	1
0	0	0	0	2	0	70.00	7	5	0	4	1	5	6	0	1	5	6
0	0	1	0	1	0	142.85	1	2	0	1	0	2	2	0	2	1	1
0	0	0	0	1	0	52.13	3	1	1	1	1	4	1	0	0	2	4
0	0	0	0	0	0	......	1	1	0	0	1	0	0	1	1	2	2
0	0	0	0	1	1	125.00	2	2	0	2	1	2	1	0	2	0	2
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	2

	Population.	Total number of deaths.	Representing annual death-rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
HUDSON VALLEY DIST.— *(Continued)*:										
Ramapo	*5,000	5	12.00	2	40.0	0	0	0	0	0
Rest of district	....	236	......	40	17.1	1	0	4	7	0
ADIRONDACK & NORTHERN DISTRICT:										
Totals	....	261	......	49	18.7	1	....	9	....	0
Argyle	3,700	2	......	0	....	0	0	0	0	0
Greenwich	*4,000	4	12.00	0	....	0	0	0	0	0
Salem	3,500	3	10.30	0	....	0	0	0	0	0
Port Edward	4,880	2	......	1	50.0	0	0	0	0	0
Glens Falls	*10,000	14	16.80	3	21.4	0	0	1	0	0
Malone	*9,000	12	14.80	4	33.3	1	0	0	0	0
Potsdam	*4,000	1	......	0	....	0	0	0	0	0
OGDENSBURGH	*12,000	20	20.00	10	50.0	0	0	0	0	0
Gouverneur	*5,500	8	17.46	0	....	0	0	1	0	0
Ellisburgh	4,811	8	20.00	1	12.5	0	0	1	0	0
Plattsburgh	*7,000	3	......	2	....	0	0	0	0	0
WATERTOWN	*12,200	21	20.65	2	9.5	0	0	3	0	0
Cape Vincent	3,143	1	......	0	....	0	0	0	0	0
Clayton	4,314	2	......	1	50.0	0	0	0	0	0
Rest of district	....	160	......	25	16.0	0	0	3	0	0
MOHAWK VALLEY DIST.:										
Totals	....	335	......	76	22.68	5	....	9	2	....
SCHENECTADY	*20,000	40	24.00	11	27.5	0	0	1	1	0
Schoharie	3,350	7	25.07	1	14.3	0	0	0	0	0
Cobleskill	3,371	5	17.80	1	20.0	0	0	0	0	0
AMSTERDAM	*20,000	28	16.80	10	35.7	1	0	1	0	0
Johnstown	*6,000	4	......	0	....	0	0	1	0	0
Gloversville	*10,000	13	15.60	2	15.4	1	0	0	0	0
Little Falls	*8,500	13	18.35	1	7.7	0	0	4	0	0
Herkimer	*3,000	......	......	0	....	0	0	0	0	0
Ilion	*4,200	2	......	1	50.0	0	0	0	0	0
UTICA	*50,000	69	16.56	18	26.1	1	0	1	1	0
Whitestown	*5,000	4	9.60	1	25.0	0	0	0	0	0
ROME	12,045	20	20.00	6	30.0	0	0	1	0	0
Boonville	*4,000	9	27.00	0	...	0	0	0	0	0
Camden	3,400	2	8.00	2	....	0	0	0	0	0
Waterford	*5,400	7	15.56	2	28.5	0	0	0	0	0
Ballston Spa	3,200	6	22.50	4	66.7	1	0	0	0	0
Saratoga Springs	*10,000	21	25.20	5	23.8	0	0	0	0	0
Rest of district	....	85	......	11	13.0	1	0	0	0	0
SOUTHERN TIER DIST.:										
Totals	....	254	......	46	18.4	2	...	6	3	....
BINGHAMTON	*30,000	29	11.60	9	31.0	0	0	2	1	0
Owego	*6,000	3	6.00	0	....	0	0	0	0	0
Candor	4,323	3	......	0	....	0	0	0	0	0
Waverly	*5,000	5	12.00	2	40.0	0	0	0	0	0
ELMIRA	*25,000	51	24.48	11	21.5	0	0	1	0	0
Horseheads	3,500	2	7.00	0	....	0	0	0	0	0
Bath	3,500	3	10.30	0	....	0	0	0	0	0
Corning	*8,000	18	......	2	....	0	0	0	1	0
Olean	*8,000	6	9.00	3	50.0	0	0	0	0	0
Westfield	3,000	4	16.00	1	25.0	0	0	0	0	0
Fredonia	*3,000	3	12.00	1	33.3	0	0	0	0	0
Rest of district	....	176	......	19	13.5	2	0	3	1	0

DECEMBER — (*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
0	0	0	0	0	0	......	1	0	0	0	1	0	1	0	0	0	2
4	0	0	0	11	1	115.38	32	33	3	18	9	12	32	7	9	32	20
1	....	2	7	18	4	160.92	30	30	3	17	14	28	18	13	13	32	21
0	0	0	0	0	0	......	1	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	......	1	1	0	0	0	1	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	2	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	0	1
0	0	0	2	0	0	214.30	0	2	0	1	0	3	2	1	0	0	2
0	0	0	0	0	1	166.67	2	2	0	0	0	0	2	0	1	3	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	0	0
0	0	1	4	0	1	300.00	1	2	0	0	0	2	0	3	1	0	5
0	0	0	0	0	0	125.00	0	0	0	0	0	2	0	1	1	1	2
0	0	0	0	0	0	125.00	2	0	0	0	0	2	0	0	0	3	0
0	0	0	0	1	0	......	0	1	0	0	0	0	1	0	0	0	0
0	0	1	0	3	0	333.33	3	1	0	1	1	2	2	1	0	3	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	1	0	0	0	0	0	1	0
1	0	0	1	14	2	131.25	19	21	3	11	12	16	9	6	10	21	11
5	....	1	3	31	4	170.10	40	42	3	26	12	23	44	13	9	39	24
0	0	0	0	8	2	300.00	2	6	0	0	2	4	7	0	5	1	1
0	0	0	0	0	0	......	1	3	0	0	0	1	1	0	0	1	0
0	0	0	0	1	0	200.00	0	0	0	0	1	1	0	0	0	1	1
0	0	1	0	2	0	178.20	8	1	1	1	1	1	5	1	0	2	2
0	0	0	0	0	0	250.00	1	0	0	0	0	0	0	1	0	0	1
0	0	0	0	0	0	......	2	1	0	2	1	2	2	0	0	1	1
0	0	0	0	2	0	461.53	1	3	0	0	1	1	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	1	0	0	0	0
3	0	0	0	6	2	202.90	9	11	0	6	3	4	13	2	0	5	2
0	0	0	0	0	0	......	1	0	0	0	0	0	2	0	0	1	0
1	0	0	0	6	0	400.00	0	0	0	3	0	2	3	1	1	2	0
0	0	0	0	0	0	......	3	1	0	2	0	0	0	1	0	2	0
0	0	0	1	0	0	500.00	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	4	1	1	1	0	0	0	0	0	0	0
0	0	0	0	0	0	166.67	1	0	0	0	0	0	1	0	0	2	1
0	0	0	1	3	0	190.59	1	4	0	1	0	0	0	1	2	3	5
1	0	0	1	3	0	70 58	5	11	1	10	3	7	8	6	1	17	10
2	1	....	3	35	3	173.09	30	20	3	16	21	20	33	12	8	31	54
0	0	0	2	2	2	310.35	6	2	0	1	2	0	4	0	0	1	4
0	0	0	0	0	0	......	0	2	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	1	0	1	0
0	0	0	0	0	0	......	2	0	0	1	0	1	1	0	0	0	0
0	0	0	1	14	1	333.33	8	3	1	1	3	2	6	1	1	3	5
0	1	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	0	2	0	1	0	0	0	0	0	0	0
0	0	0	0	4	0	......	0	3	0	0	2	2	1	2	2	1	0
0	0	0	0	0	0	......	2	0	0	0	0	1	1	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	2	2
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	1	0
2	0	0	0	15	0	121.43	12	8	2	12	13	12	18	8	5	21	42

MONTHLY BULLETIN FOR

	Population.	Total number of deaths.	Representing annual death rate per 1,000 of	Deaths under five years.	Percentage of deaths under five years to total deaths.	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.
EAST CENTRAL DIST.										
Totals		[illegible]		[illegible]	[illegible]			[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rest of district		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
WEST CENTRAL DIST.										
Totals		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rest of district		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible] AND [illegible] DIST.										
Totals		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rest of district		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Totals of [illegible]		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	53	
Totals of [illegible] 1886		[illegible]		[illegible]	[illegible]	[illegible]		138	63	[illegible]

* For 4 [illegible] weeks.

[illegible] excess of that of November [illegible] average death rate per 1,000 of [illegible] percentage of deaths from [illegible] 1886. This is probably due in part to the [illegible] The number of deaths is increased for [illegible]

NOTE.—The boundaries of Sanitary [illegible]

DECEMBER — (*Concluded*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory syst'm	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
2	....	0	2	19	4	116.52	43	36	9	19	10	33	31	11	18	52	21
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	......	1	0	0	1	0	0	1	0	0	2	0
0	0	0	0	0	0	......	0	0	0	0	0	0	2	0	0	2	0
0	0	0	0	6	0	666.66	2	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	0	1	0
0	0	0	0	0	0	......	1	1	0	0	0	0	2	0	0	0	0
0	0	0	0	0	0	......	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	222.22	3	0	0	0	0	1	1	0	0	1	1
0	0	0	0	0	0	......	2	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	......	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	5	3	129.03	11	12	6	8	5	15	5	4	10	4	1
0	0	0	0	0	0	......	1	1	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	......	0	1	0	1	0	0	0	0	0	0	0
2	0	0	2	7	1	94.45	21	21	3	9	5	15	19	7	7	42	16
2	....	1	2	11	....	112.40	25	23	...	11	8	22	40	8	7	50	19
0	0	0	0	5	0	214.42	5	4	0	3	1	3	10	1	0	6	0
1	0	0	1	2	0	454.54	0	0	0	0	1	4	0	0	0	1	0
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	0
1	0	0	0	0	0	222.22	0	2	0	0	1	1	0	0	0	1	2
0	0	0	0	0	0	......	0	0	0	0	1	0	0	0	0	1	1
0	0	0	0	0	0	......	0	0	0	0	0	0	1	0	0	0	1
0	0	0	1	0	0	333.33	1	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	......	3	0	0	0	0	2	0	0	2	0	1
0	0	0	0	0	0	......	0	1	0	2	0	1	1	0	0	0	1
0	0	0	0	0	0	......	1	2	0	0	0	0	1	1	0	1	2
0	0	0	0	0	0	......	0	1	0	0	0	1	1	1	0	1	0
0	0	1	0	4	0	70.42	15	13	0	6	4	10	24	5	6	39	11
3	6	1	8	21	6	111.10	108	81	6	40	22	59	79	28	47	54	116
0	0	0	0	0	0	......	4	4	0	2	2	2	1	3	1	2	2
0	0	0	1	0	0	125.00	0	1	0	1	0	2	1	0	2	0	0
0	0	0	0	0	0	......	0	0	0	0	0	1	0	0	2	1	0
0	0	0	0	0	1	111.11	2	1	1	0	0	1	0	1	1	0	1
0	0	0	0	0	0	......	1	1	0	0	0	1	0	1	0	1	1
0	1	0	1	0	0	250.00	1	2	0	0	1	0	1	1	0	0	0
0	5	1	0	2	0	96.40	27	24	2	9	8	10	18	6	5	14	25
0	0	0	0	0	0	400.00	2	0	0	0	1	0	0	0	0	0	0
0	0	0	1	0	0	166.67	0	0	0	1	0	1	2	0	0	0	1
0	0	0	0	0	0	......	0	1	0	0	0	2	1	0	0	2	1
0	0	0	0	0	0	......	2	1	0	0	1	1	1	1	0	0	2
0	0	0	0	0	0	......	1	2	0	2	1	1	0	0	0	0	3
2	0	0	4	19	3	156.67	46	31	3	16	7	23	33	7	26	0	63
0	0	0	0	0	0	125.00	1	0	0	1	0	0	2	1	1	0	1
0	0	0	0	0	0	......	0	0	0	0	0	1	1	0	0	0	1
1	0	0	1	0	2	60.00	21	13	0	8	1	13	18	7	9	34	15
73	33	22	84	546	110	126.35	1,631	1,131	83	461	466	657	949	240	288	455	1046
278	138	33	113	621	87	179.00	1,392	1,017	95	434	461	584	917	232	345	577	817

ending December 28.
but is not much higher than that of December, 1888. In 130 cities, villages and large towns having an
In the rate of infant mortality there is little variation from last month. The proportion of deaths from
causes as the actual zymotic mortality varies very little from that of last month. From respiratory diseases
appearance generally throughout the State at the commencement of the last week of the month of epidemic
nervous diseases. Consumption causes an unusual proportion of deaths, 133.33 per 1,000 total mortality.
Districts, see Annual Summary.

SUMMARY OF MORTALITY OF THE STATE OF NEW YORK, FOR THE YEAR 1880, AS PUBLISHED IN THE MONTHLY BULLETIN.

Totals of mortalities of the State by months.

MONTHS.	[illegible]	[illegible]	[illegible]	Cerebro-spinal fever.	Typhus fever.	Typhoid fever.	Malarial diseases.	Small-pox.	Scarlet fever.	Measles.	[illegible]	[illegible]	[illegible]
January	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
February	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
March	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
April	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
June	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
July	[illegible]	[illegible]	[illegible]	[illegible]		117	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
August	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
September	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
October	[illegible]	[illegible]	[illegible]	[illegible]	....	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
November	[illegible]	[illegible]	[illegible]	[illegible]	.	[illegible]	[illegible]	.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
December	[illegible]	[illegible]	[illegible]	[illegible]	..	117	[illegible]	..	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Totals for first six months	[illegible]	[illegible]	[illegible]	[illegible]	....	[illegible]	[illegible]	[illegible]	1,740	770	[illegible]	[illegible]	[illegible]
Totals for last six months	[illegible]	[illegible]	[illegible]	[illegible]	...	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Totals for the year	[illegible]	[illegible]	[illegible]	[illegible]	....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUMMARY OF MORTALITY, ETC. — (*Continued*).

MONTHS.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
January	101	170.32	1,473	1,061	77	421	469	577	946	194	279	507	896
February	75	170.00	1,447	947	100	401	461	574	922	183	256	507	996
March	115	167.50	1,840	1,195	109	468	488	662	1,004	228	237	624	1,092
April	122	174.20	1,656	1,092	125	429	478	574	986	222	311	590	1,029
May	123	155.91	1,172	1,102	86	511	421	599	951	227	377	548	1,061
June	1,112	241.82	744	919	77	639	386	485	951	222	376	414	1,133
July	3,092	352.20	537	1,012	63	844	449	542	1,029	227	357	502	1,394
August	1,901	280.75	591	1,026	63	680	437	540	936	254	373	477	1,196
September	1,094	234.26	646	949	65	638	794	483	870	206	326	446	872
October	339	177.00	969	1,016	64	557	431	595	899	238	343	491	1,032
November	110	139.60	1,133	944	67	450	452	599	822	199	311	419	868
December	110	126.30	1,635	1,127	83	463	466	656	950	238	288	455	1,046
Totals for first six months	1,648	179.79	8,332	6,316	574	2,869	2,703	3,471	5,760	1,276	1,836	3,190	6,207
Totals for last six months	6,646	232.31	5,501	6,074	405	3,632	3,029	3,415	5,506	1,362	1,998	2,790	6,408
Totals for the year	8,294	206.00	13,833	12,390	979	6,501	5,732	6,886	11,266	2,638	3,834	5,980	12,615

[illegible] ANNUAL REPORT OF THE [illegible]

[illegible]

SUMMARY OF MORTALITY, ETC.— (*Continued*).

DISTRICTS.	Diarrhœal diseases.	Zymotic deaths per 1,000 deaths from all causes.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrhœal.	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
Maritime district	5,596	224.59	9,619	8,014	599	3,866	4,191	3,653	6,665	1,358	2,157	1,491	8,897
Hudson Valley district	681	209.97	1,310	1,454	83	725	453	1,043	1,134	291	425	1,090	815
Adirondack and Northern district	194	148.60	330	381	32	216	117	237	364	110	114	484	289
Mohawk Valley district	305	163.47	477	527	36	303	189	36	549	180	187	631	412
Southern Tier district	196	161.06	361	300	35	254	128	282	416	120	147	436	355
East Central district	346	179.72	434	476	69	267	176	377	497	158	150	660	244
West Central district	136	123.37	293	322	18	200	137	255	366	104	146	510	227
Lake Ontario and Western district	840	172.63	1,029	1,016	107	670	341	688	1,285	307	503	778	1,336

SUMMARY OF MORTALITY, ETC. (*Continued*).

DISTRICTS	FROM TYPHOID FEVER.					FROM DIARRHOEAL DISEASES.				
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
In each 1,000 deaths there were in the										
Maritime district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hudson Valley district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Adirondack and Northern district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mohawk Valley district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Southern Tier district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
East Central district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
West Central district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lake Ontario and Western district	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
The entire State	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUMMARY OF MORTALITY, ETC. — (*Concluded*).

DISTRICTS.	From Diphtheria.					From Consumption.				
	1885.	1886.	1887.	1888.	1889.	1885.	1886.	1887.	1888.	1889.
In each 1,000 deaths there were in the										
Maritime district	58.28	71.43	75.40	67.95	63.00	143.58	140.52	121.80	124.10	123.20
Hudson Valley district	64.87	61.93	58.50	64.27	65.00	144.83	137.00	134.85	114.20	130.92
Adirondack and Northern district	72.08	43.35	49.00	46.57	33.87	147.82	137.90	122.00	110.91	121.76
Mohawk Valley district	44.74	36.80	67.40	65.52	52.12	143.67	132.30	111.25	115.36	113.50
Southern Tier district	27.57	41.03	44.40	34.18	34.54	114.25	100.95	94.40	100.73	88.49
East Central district	32.74	40.34	30.60	43.10	33.79	139.93	131.52	118.40	110.61	110.95
West Central district	22.63	20.42	30.80	23.38	27.07	155.08	141.08	115.40	112.20	110.35
Lake Ontario and Western district	49.53	58.25	58.67	51.09	35.78	130.00	125.77	105.55	103.60	104.46
The entire State	56.06	64.48	67.24	61.73	56.12	139.76	137.66	120.35	118.55	120.01

REMARKS.—The SANITARY DISTRICTS into which the State is divided are as follows: *Maritime* (population in 1880, 2,098,589; present estimated CITY population, 2,463,000): Includes, New York, Long Island, Staten Island and Westchester county. *Hudson Valley* (population in 1880, 750,143; present estimated CITY population, 269,100): All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern* (population in 1880, 330,434; present estimated CITY population, 24,000): The northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson, Lewis. *Mohawk Valley* (population in 1880, 280,809; present estimated CITY population, 102,000): Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties. *Southern Tier* (population in 1880, 365,746; present estimated CITY population, 70,000): The seven counties along the southern border of the State. *East Central* (population in 1880, 354,320; present estimated CITY population, 80,000): Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central* (population in 1880, 321,247; present estimated CITY population, 36,000): Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western* (population in 1880, 578,705; present estimated CITY population, 399,000): Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties. No census of the State has been taken since 1880; the population may be estimated at about 5,750,000.

There have been 104,233 deaths reported during the year in the Monthly Bulletin; besides these about 3,000 death returns have been received too late for insertion, in all 107,233. Of these 77,990 came from twenty-eight cities having an aggregate population of 3,442,000, the death rate per 1,000 being 22.66. At the estimated population for the State (disregarding about 80,000 of the population making no returns whatever of vital statistics) of 5,750,000, the death rate of the State is 18.65 per 1,000 annually; that of the portion of the State outside the cities is 13.00 per 1,000 of the population, the returns, however, being incomplete.

The ZYMOTIC death rate for the cities is 4.96 per 1,000 population; for the entire State, 3.89. The prevalence of *small-pox*, which began in 1887 and continued through 1888, came to an end in June, a few cases from a fresh source occurring latter at Albany and Binghamton; for several months there has been freedom from it in the State. *Diphtheria* has, for two years, shown a lowered death rate; 1.03 per 1,000 population for 1889. *Scarlet fever* has prevailed to the same degree as in 1888. *Whooping cough* caused 0.23 deaths per 1,000 population, nearly as many as typhoid fever, having been more prevalent than for years. *Measles* has also been unusually prevalent. *Typhoid fever* has been somewhat more prevalent, having a death rate per 1,000 population of 0.27. Other zymotic diseases caused fewer deaths than last year. From *consumption* there were 2.78 per 1,000 population in the cities and 1.20 per 1,000 for the rest of the State. From *acute respiratory diseases* there were 2.36 deaths per 1,000 population in the entire State, being the same as in 1888. There were more deaths, proportionately, than last year from *urinary* and *circulatory* diseases and fewer deaths from *old age*.

FOOD AND DRUGS.

FOOD AND DRUGS.

REPORT

OF

WILLIS G. TUCKER, M. D., Ph. D.,

ANALYST OF DRUGS.

LEWIS BALCH, M. D., *Secretary of the State Board of Health of New York:*

DEAR SIR.— During the past year the collection and examination of drugs from retail dealers in different parts of the State has been continued, under your direction, and in substantially the same manner as heretofore. Four hundred and seventeen, samples of pharmacopœial drugs, preparations and chemicals, purchased from druggists in twenty places, and 115 samples of cream of tartar, purchased from retail grocers, have been examined and reported upon during the year, making a total of 532 samples examined since time of making last annual report. Monthly reports, accompanied by a separate report on each sample examined, have been regularly submitted and the latter have given in each instance the record number and pharmacopœial name of the article tested; name and place of business of dealer from whom purchased; date of purchase, amount called for, price paid and name of collector. The quality of the article, as determined by the analysis, has likewise been stated, the same standards being employed that have heretofore been used. Concerning these standards I quote from a previous report: "Samples are classed as of 'good quality' when they fulfill the requirements of the United States pharmacopœia or fall below the same, only in some trifling and unimportant respect; of 'fair quality' if, while not fully up to the pharmacopœial standard, they are evidently neither

intentionally adulterated nor decidedly below such standard, and of 'inferior quality,' if clearly adulterated or falsified, lacking in any important constituent, deficient in strength from improper manufacture, partial or complete decomposition or other causes, or containing an undue amount of impurity. In some cases, through ignorance or intent, a wrong article has been sold or some inferior article of a nature similar to that called for has been substituted and such samples have been classed under the head 'not as called for.'" Articles like the diluted acids, possessing excessive strength, have been classed under that head. The reports have also stated the respects in which samples not of good quality have been found to be deficient or inferior, and have given such other particulars as have been deemed necessary in special cases. Not having been published elsewhere these reports are now collected and embodied in this annual report.

SELECTION OF SAMPLES.

The object of the work, as now carried on, being not so much to determine the proportion of adulterated to pure drugs now found upon the market, as to expose actual adulteration, sophistication and carelessness in the preparation of common drugs and pharmacopœial compounds; inform the public and caution dealers, no attempt has been made to collect a great variety of articles. Therefore, such as are known to be seldom adulterated or impure have not been called for but such substances have been selected as would test the knowledge, accuracy and integrity of the dealer. Some rather unimportant drugs have been collected for this reason though none but officinal (pharmacopœial) articles have been called for. Medicinal alkaloids and preparations containing them having been assigned to another analyst, such articles have been omitted in the collection of samples.

NOTIFICATION OF DEALERS.

Notices have, as heretofore, been promptly sent from the central office to all dealers whose samples have been found to be of inferior quality, warning them to desist from the sale of such articles and it is believed that these notices, which have in most cases been gratefully received and cheerfully complied with, have had a most salutary effect in correcting various errors and abuses. In a

number of cases dealers thus notified have written for further information or to explain, excuse or deny the sale of samples complained of, but it has been in no case shown that any reasonable cause for complaint existed. In the tables accompanying this report the name and residence of all dealers from whom samples have been collected are, for the first time, stated.

COLLECTION OF SAMPLES.

The 532 samples examined during the year were collected under my direction by my assistant, Dr. A. G. Losee of Albany, in Albany, Amsterdam, Bath-on-the-Hudson (Rensselaer county), Buffalo, Central Bridge, Cobleskill, Cohoes, East Albany, Fonda, Fort Plain, Greenbush (Rensselaer county), Green Island, Little Falls, Oneonta, Schenectady, Schoharie, St. Johnsville, Syracuse Troy and West Troy. A written order has in every instance been tendered, this order giving in full the officinal names of the articles called for and the amount desired. No good excuse can, therefore, be urged by the seller for any error or substitution in the filling of orders so explicit. All samples have been numbered and fully labeled (the original label if attached by the seller being also preserved) and kept for subsequent examination, if necessary, in any disputed case.

The following table shows the nature and number of the 532 samples examined and the place where purchased. It has been again observed that the price paid bears little relation to the quality of the articles supplied, the highest priced samples being frequently of inferior quality and *vice versa*.

TABLE OF SAMPLES, ETC.

PLACE WHERE PURCHASED.

ARTICLE	East Albany.	Cohoes.	Fort Plain.	Green Bush.	Green Island.	Little Falls.	Ilion.	Schenectady.	Saratoga.	St. Johnsville.	Syracuse.	Troy.	West Troy.	Total number.
Acetic acid, diluted	4			1		1	2	3			1	6		10
[illegible]											9			14
[illegible]														6
[illegible]														4
[illegible]														6
[illegible]							1		1		8			10
[illegible]			2		2	1	1				11	3		21
[illegible]														115
[illegible]	1			2	1		2	5	1	1	8	1	1	49
[illegible]						2								2
[illegible]	4	2	3	2	1	2	1	2		1	13	2	1	68
[illegible]			1			1		1			1	5		38
Hydrochloric acid, diluted											5			10
[illegible]											5			5
Nitric acid, diluted											1	1		4
[illegible]														2
[illegible]		1				2			1	1		1		8
Saffron [illegible]								1			6	8		21
Santonin														4
Seidlitz powder		1				1	1		1	1		1		7
Sulphur, precipitated	1			1				2			10	5	2	31
Sulphur, washed					2			1			7	1	1	15
Sulphuric acid, diluted	3			6							4	1		50
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	41	[illegible]	[illegible]

METHODS OF ANALYSIS.

None but pharmacopœial articles having been collected, and the standard of quality prescribed by the Pharmacopœia being the legal standard to which articles included therein must conform, the pharmacopœial tests and analytical methods have been generally followed. While exhaustive analyses have not often been necessary, in most cases at least one quantitative determination has been made.

SUMMARY OF RESULTS.

Of the 532 samples examined there were classed as of:

	Per cent.
Good quality	233 or 43.8
Fair quality	54 or 10.2
Inferior quality	130 or 24.4
Not as called for	33 or 6.2
Excessive strength	24 or 4.5
Fictitious	58 or 10.9

As stated in previous reports these percentages "by no means represent the proportions of good, bad and indifferent drugs on the market and on sale at the stores, since only those articles which were considered likely to be adulterated or known to be frequently of inferior quality, were collected. Had samples of drugs and pharmaceutical preparations been selected at random the proportion of pure and good articles would have been very much larger." The comparatively large proportion of articles wrongly sold reported above as "not as called for" and "fictitious," is chiefly due to the sale of common safflower for real saffron and of cream tartar substitutes by grocers for the genuine article.

The following were the articles examined:

DILUTED ACETIC ACID — (*Acidum aceticum dilutum, U. S. P.*).

Forty samples examined of which there were of good quality, nine; fair, six; inferior, nineteen, and of excessive strength, six. The Pharmacopœia requires six per cent of absolute acetic acid. These samples varied from 1.90 to 32.80 per cent and, rejecting the six samples of excessive strength, averaged 4.6 per cent. Some of these samples have been prepared without any regard to

accuracy, and in some cases the practically undiluted acid has been sold. It is not to be expected that such preparations will be made with scientific precision, but gross carelessness in their manufacture is inexcusable. Diluted acetic acid is employed in the preparation of "spirit of mindererus," and if it is below or above the proper strength this solution will be either too weak or too strong, neither of which conditions is desirable. The following table gives a description of each of the samples:

DILUTED ACETIC ACID, U. S. P.

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Per cent.	Quality.
1337	July 18, 1888	H. V. Roese	Buffalo	4.40	Inferior.
1338	July 18, 1888	E. J. Liebetrut	Buffalo	6.30	Good.
1339	July 18, 1888	Bontecou & Mosher	Buffalo	3.20	Inferior.
1340	July 18, 1888	Rieffenstahl Bros	Buffalo	5.90	Good.
1341	July 18, 1888	J. P. & J. W. Diehl	Buffalo	4.40	Inferior.
1394	July 21, 1888	C. W. Snow & Co	Syracuse	4.00	Inferior.
1395	July 21, 1888	Brown & Dawson	Syracuse	4.10	Inferior.
1396	July 21, 1888	R. E. Smith	Syracuse	1.90	Inferior.
1397	July 21, 1888	J. C. Auchampaugh	Syracuse	3.90	Inferior.
1486	March 26, 1889	Reed Hogan	Cobleskill	3.40	Inferior.
1487	March 26, 1889	E. E. Ford	Oneonta	4.10	Inferior.
1488	March 26, 1889	T. E. Marsh	Oneonta	14.90	Excessive strength.
1492	April 11, 1889	Bradford & Dickinson*	Amsterdam	3.50	Inferior.
1493	April 11, 1889	C. W. Striker*	Amsterdam	7.90	Good.
1494	April 11, 1889	H. G. Babcock & Co*	Little Falls	32.80	Excessive strength.
1524	May 14, 1889	H. Schneider	Troy	3.00	Inferior.
1525	May 14, 1889	C. H. Shacklady	Troy	4.50	Fair.
1526	May 14, 1889	Noncrief & Francis	Troy	4.00	Inferior.
1527	May 14, 1889	R. H. Starbuck	Troy	5.80	Good.
1528	May 14, 1889	J. M. Donnelly	Troy	4.30	Inferior.
1563	May 23, 1889	William Sauter	Schenectady	4.50	Fair.
1564	May 23, 1889	N. H. Kittle	Schenectady	3.40	Inferior.
1565	May 23, 1889	W. T. Hanson & Co	Schenectady	4.20	Inferior.
1587	May 31, 1889	W. H. Flandrau	Troy	3.20	Inferior.

[illegible] (*Concluded.*)

[illegible]	[illegible]	[illegible]	[illegible]	Where purchased.	Per cent.	Quality.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	23 90	Excessive strength.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	6 70	Good.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	6 40	Good
[illegible]	[illegible]	[illegible]	[illegible]	Albany	11 70	Excessive strength.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	20 80	Excessive strength.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	3 20	Inferior.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	4 50	Fair.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	5 40	Fair.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	3 90	Inferior.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	6 00	Fair.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	4 80	Fair.
[illegible]	[illegible]	[illegible]	[illegible]	Bath on the Hudson	30 80	Excessive strength.
[illegible]	[illegible]	[illegible]	[illegible]	East Albany	3 00	Inferior.
[illegible]	[illegible]	[illegible]	[illegible]	Greenbush	6 50	Good.
[illegible]	[illegible]	[illegible]	[illegible]	East Albany	5 50	Good.
[illegible]	[illegible]	[illegible]	[illegible]	Albany	7 00	Good.

[illegible] sample

ALCOHOL — (*Alcohol, U. S. P.*).

Fourteen samples examined, of which there were of good quality twelve; fair quality, one, and one consisted of compound spirit of ether of inferior quality, the dealer having placed the wrong labels upon Nos. 1,384 and 1,392. The samples are described in the following table:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Specific gravity at sixty degrees Fahrenheit.	Quality.
1332	July 18, 1888	H. V. Roese	Buffalo	0.819	Good.
1333	July 18, 1888	E. J. Liebetrut	Buffalo	0.821	Good.
1334	July 18, 1888	Bontecou & Mosher	Buffalo	0.823	Good.
1335	July 18, 1888	Rieffenstahl Bros	Buffalo	0.823	Good.
1336	July 18, 1888	J. P. & J. W. Diehl	Buffalo	0.824	Good.
1376	July 20, 1888	G. W. Holloway	Syracuse	0.822	Good.
1377	July 20, 1888	Jones & Hitchcock	Syracuse	0 821	Fair.
1378	July 20, 1888	G. A. Heyne	Syracuse	0.825	Good.
1379	July 21, 1888	Dr. D T. Whyborn	Syracuse	0.821	Good.
1380	July 21, 1888	C. W. Snow & Co	Syracuse	0.821	Good.
1381	July 21, 1888	Brown & Dawson	Syracuse	0.825	Good.
1382	July 21, 1888	L. H. Hollon	Syracuse	0.821	Good.
1383	July 21, 1888	R. E. Smith	Syracuse	0.822	Good.
1384	July 21, 1888	J. C. Auchampaugh	Syracuse	....	Wrong label attached; consists of compound spirits of ether.

BENZOIC ACID — (*Acidum Benzoicum, U. S. P.*).

Six samples examined all of which were of good quality as follows:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1450	March 9, 1889	C. W. Striker	Amsterdam	Good.
1451	March 9, 1889	Powell & Gilbert	Amsterdam	Good.
1452	March 9, 1889	Warnick & Reid	Amsterdam	Good.
1453	March 9, 1889	G. H. Ingraham	Amsterdam	Good.
1454	March 9, 1889	Bradford & Dickinson	Amsterdam	Good.
1455	March 9, 1889	N. C. Becker	Amsterdam	Good.

SUBNITRATE OF BISMUTH — (*Bismuthi subnitras, U. S. P.*).

Five samples examined and all of good quality, as follows:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1456	March 9, 1889	C. W. Striker	Amsterdam	Good.
1457	March 9, 1889	Powell & Gilbert	Amsterdam	Good.
1458	March 9, 1889	Warnick & Reid	Amsterdam	Good.
1459	March 9, 1889	Joseph Donnelly	Amsterdam	Good.

OXALATE OF CERIUM — (*Cerii Oxalas, U. S. P.*).

Four samples examined, of which one was of good quality, two of fair quality and one inferior, containing decided traces of metallic impurities, as follows:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1460	March 9, 1889	E. W. Clark	Amsterdam	Good.
1461	March 9, 1889	G. H. Ingraham	Amsterdam	Fair.
1462	March 9, 1889	Bradford & Dickinson	Amsterdam	Fair.
1463	March 9, 1889	J. A. Barkhuff	Amsterdam	Inferior.

CHLORAL—(*Chloral, U. S. P.*).

Ten samples examined, of which six were of good, three of fair and one of inferior quality, containing traces of hydrochloric acid and other impurities. The following table describes the samples:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1408	July 21, 1888	P. L. Ryan & Co	Syracuse	Good.
1409	July 21, 1888	J. C. Bowe	Syracuse	Fair.
1410	July 21, 1888	E. A. Eaton	Syrscuse	Good.
1411	July 21, 1888	J. W. Young & Co	Syracuse	Fair.
1412	July 21, 1888	E. B. Covert	Syracuse	Inferior.
1413	July 21, 1888	Smith & Dalton	Syracuse	Fair.
1414	July 21, 1888	Newton & Hickock	Syracuse	Good.
1415	July 21, 1888	E. S. Petrie	Syracuse	Good.
1471	March 26, 1889	Alfred Parrott	Schoharie	Good.
1472	March 26, 1889	E. R. Ford	Oneonta	Good.

PURIFIED CHLOROFORM — (*Chloroformum Purificatum, U. S. P.*).

Twenty-one samples examined, of which there were of good quality, fifteen; fair, five; and inferior, one. The U. S. P. requires a specific gravity of 1.485-1.490 at 15 degrees C. (59 degrees F.) The quality of the purified chloroform now on sale is greatly superior to that formerly upon the market. The following table gives a description of the samples:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Spec. gravity at 60° Fahr.	Quality.
1352	July 20, 1888	G. W. Holloway	Syracuse	1.490	Good.
1353	July 20, 1888	Jones & Hitchcock	Syracuse	1.490	Good.
1354	July 20, 1888	O. B. Heyne	Syracuse	1.481	Inferior.
1355	July 21, 1888	E. A. Eaton	Syracuse	1.490	Good.
1356	July 21, 1888	Newton & Hickock	Syracuse	1.491	Good.
1357	July 21, 1888	L. H. Hollon	Syracuse	1.490	Good.
1358	July 21, 1888	W. B. Bissell	Syracuse	1.491	Good.
1359	July 21, 1888	D. Derby	Syracuse	1.492	Good.
1360	July 21, 1888	H. E. Richardson	Syracuse	1.482	Fair.
1361	July 21, 1888	W. D. Tallman	Syracuse	1.479	Fair.
1362	July 21, 1888	W. B. Fuller	Syracuse	1.491	Good.
1484	March 26, 1889	C. McCulloch	Central Bridge	1.484	Good.
1485	March 26, 1889	G. E. Moore	Oneonta	1.488	Fair.
1515	April 11, 1889	Devoe & Shumway	Fort Plain	1.492	Good.
1516	April 11, 1889	H. G. Martin & Co	Fort Plain	1.492	Good.
1517	April 11, 1889	E. I. Stinson*	Little Falls	1.490	Good.

[illegible]	[illegible]	[illegible]	Troy	[illegible]	[illegible]
1880	May 31, 1889	M. A. Barnhart	Green Island	1.489	Good.
1881	May 31, 1889	J. L. Wright	Green Island	1.488	Fair.
1890	May 31, 1889	E. F. Leahy	Troy	1.488	Fair.
				1.490	Good.

* Second sample.

"CREAM OF TARTAR"—(*Potassii Bitartras, U. S. P.*).

One hundred and fifteen samples collected from retail grocery stores in the city of Albany, exclusively, were examined, previous investigation having shown that a pure article is almost invariably sold by druggists. The results of the examination of these samples will be surprising to those who are not informed upon this subject, for only thirty of the samples, or twenty-six per cent of the total number, consisted of real and unadulterated cream of tartar. With the exception of six samples, rated as fair, in which the amount of adulterants was comparatively small, the remaining eighty-five samples, were either largely adulterated or entirely fictitious. Of this number, nineteen, rated as inferior, were adulterated either with starch, acid phosphate of lime or sulphate of lime in varying quantities, not less than eighty per cent of the adulterant or make-weight, being present in some instances. Fifty-eight of the samples were entirely fictitious of which number ten were chiefly acid phosphate of lime (containing considerable sulphate); twenty-three were chiefly acid phosphate of lime and starch; eleven were chiefly tartaric acid and sulphate of lime and fourteen consisted of tartaric acid, sulphate of lime and starch. Two samples consisted of poor baking powder sold by mistake for cream of tartar. The sale of such miserable imitations for real cream of tartar is evidently without excuse and as the fraudulent substitute is frequently sold at the price of the genuine with perhaps less than a quarter and seldom more than half of its strength it is evident that the purchaser is both deceived and defrauded. These substitutes are to be condemned also as being, in all probability, less wholesome than the article they replace. The following table gives particulars concerning the samples:

Cream of Tartar — Purchased from Grocers.

Number of sample.	Date of collection.	Of whom purchased.	Where purchased.	Quality.
1749	October 4, 1889	James Ramsay	Albany	97.70 per cent pure; good quality.
1750	October 4, 1889	William McBurney	Albany	98 30 per cent pure; good quality.
1751	October 4, 1889	T. G. Crippen	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1752	October 4, 1889	M. K. Layman	Albany	Chiefly tartaric acid and sulphate of line; fictitious.
1753	October 4, 1889	M. A. Byrne	Albany	Largely starch; 30.10 per cent cream of tartar; inferior quality.
1754	October 4, 1889	P. H. Farley	Albany	Chiefly acid phosphate of lime; fictitious.
1755	October 4, 1889	J. R. Butler	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1756	October 4, 1889	W. F. Kearney	Albany	Chiefly acid phosphate of lime; some starch; fictitious.
1757	October 4, 1889	M. A. Reilly	Albany	An inferior baking powder; error in sale.
1758	October 4, 1889	Peter Snyder	Albany	Chiefly acid phosphate of lime; fictitious.
1759	October 4, 1889	Hart & Young	Albany	Chiefly tartaric, sulphate of lime and starch; fictitious.
1760	October 4, 1889	W. E. Drislane	Albany	96.50 per cent pure; good quality.
1761	October 4, 1889	Stephenson's	Albany	Adulterated with starch; 62.70 per cent cream of tartar; inferior quality.
1762	October 4, 1889	Stewart Campbell	Albany	Contains acid phosphate of lime and starch; inferior quality.
1763	October 4, 1889	H. Pemberton	Albany	Contains acid phosphate of lime and starch; inferior quality.

CREAM OF TARTAR — PURCHASED FROM GROCERS — (*Continued*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1764	October 4, 1889	J. & P. McGinnis	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1765	October 4, 1889	E. A. Hobbs	Albany	97.10 per cent pure; good quality.
1766	October 4, 1889	H. Hunt	Albany	98.39 per cent pure; good quality.
1767	October 4, 1889	G. C. Benedict	Albany	Contains a little starch and acid phosphate lime; fair quality.
1768	October 4, 1889	C. E. Tinker	Albany	Chiefly acid phosphate of lime; a little starch; fictitious.
1769	October 4, 1889	Edward Riley	Albany	97.73 per cent pure; good quality.
1770	October 4, 1889	Edward Ryan	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1771	October 4, 1889	Thomas Maher	Albany	Contains a little acid phosphate of lime and starch; fair quality.
1772	October 4, 1889	E. Ruff	Albany	Chiefly acid phosphate of lime; fictitious.
1773	October 4, 1889	Wayne & Van Zandt	Albany	Chiefly acid phosphate of lime; some starch; fictitious.
1774	October 4, 1889	F. M. Jones	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1775	October 4, 1889	Marker & Garrett	Albany	97.73 per cent pure; good quality.
1776	October 4, 1889	D. T. Fuller	Albany	Contains some acid phosphate of lime and starch; fair quality.
1777	October 4, 1889	F. Thornton	Albany	87.71 per cent pure; fair quality.
1778	October 4, 1889	G. H. Amsdell	Albany	98.98 per cent pure; good quality.

1779	October 4, 1889	A. E. Clow	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1780	October 5, 1889	G. F. Convery	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1781	October 5, 1889	T. J. Hannan	Albany	Chiefly acid phosphate of lime; a little starch; fictitious.
1782	October 5, 1889	C. C. Walker	Albany	97.10 per cent pure; good quality.
1783	October 5, 1889	J. H. Downs	Albany	Chiefly real cream of tartar; fair quality.
1784	October 5, 1889	Philip Schaeffer	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1785	October 5, 1889	Peter Deiseroth	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.
1786	October 5, 1889	John Vageline	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.
1787	October 5, 1889	M. S. Keenholts	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.
1788	October 5, 1889	J. H. Pauley	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1789	October 5, 1889	L. H. Kircher	Albany	Largely starch; inferior quality.
1790	October 5, 1889	E. Troidle	Albany	Chiefly real cream of tartar; fair quality.
1791	October 5, 1889	J. W. & J. R. Van Alstyne	Albany	Contains starch and some acid phosphate of lime; inferior quality.
1792	October 5, 1889	Bouton & Vine	Albany	Baking powder sold by mistake; error in sale.
1793	October 5, 1889	William Thornton	Albany	97.10 per cent pure; good quality.
1794	October 5, 1889	E. J. Lord	Albany	97.73 per cent pure; good quality.
1795	October 5, 1889	J. H. Cassidy	Albany	97.73 per cent pure; good quality.
1796	October 5, 1889	J. H. Pepper	Albany	Contains starch and some acid phosphate of lime; inferior quality.
1797	October 5, 1889	Allen Bros	Albany	Chiefly acid phosphate of lime; fictitious.
1798	October 5, 1889	W. C. Randall	Albany	Chiefly acid phosphate of lime and starch; fictitious.

CREAM OF TARTAR — (*Continued*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1799	October 5, 1889	A. Distell	Albany	Chiefly starch; 36.33 per cent cream of tartar; inferior quality.
1800	October 5, 1889	S. E. Lape	Albany	Chiefly acid phosphate of lime; fictitious.
1801	October 5, 1889	Mrs. P. Steinbach	Albany	Chiefly acid phosphate of lime; fictitious.
1802	October 5, 1889	C. F. Karl	Albany	Contains acid phosphate of lime and a little starch; inferior quality.
1803	October 5, 1889	G. H. Coughtry	Albany	Contains acid phosphate of lime and a little starch; inferior quality.
1804	October 5, 1889	Thomas White	Albany	Chiefly acid phosphate of lime; fictitious.
1805	October 5, 1889	K. Flannery	Albany	97.73 per cent pure; good quality.
1806	October 5, 1889	J. F. Collins	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1807	October 5, 1889	James Murphy	Albany	Largely starch; 22.55 per cent cream of tartar; inferior quality.
1808	October 5, 1889	L. J. Hopkins	Albany	Contains acid phosphate of lime and starch; inferior quality.
1809	October 5, 1889	J. Grogan	Albany	96.48 per cent pure; good quality.
1810	October 5, 1889	George Drew	Albany	Contains acid phosphate of lime and starch; inferior quality.
1811	October 5, 1889	M. J. Dillen	Albany	98.98 per cent pure; good quality.
1812	October 5, 1889	F. W. Van Slyke	Albany	98.39 per cent pure; good quality.
1813	October 5, 1889	Henry Streibert	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.

1814	October 29, 1889	G. S. Rivenburgh	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1815	October 29, 1889	Calkins Bros	Albany	Chiefly tartaric acid and sulphate of lime; fictitious
1816	October 29, 1889	C. E. Clark	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1817	October 29, 1889	M. O'Sullivan	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1818	October 29, 1889	J. Cantwell & Son	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1819	October 29, 1889	B. B. Dunham	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1820	October 29, 1889	E. Palmer	Albany	93.97 per cent pure; good quality.
1821	October 29, 1889	T. W. O'Hagan	Albany	Chiefly acid phosphate of lime; trifle starch; fictitious.
1822	October 29, 1889	A. S. Moseley	Albany	97.73 per cent pure; good quality.
1823	October 29, 1889	J. Denn	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1824	October 30, 1889	Arthur Banfill	Albany	98.98 per cent pure; good quality.
1825	October 30, 1889	J. H. Armatage	Albany	Chiefly acid phosphate of lime; a little starch; fictitious.
1826	October 30, 1889	F. W. Sarauw	Albany	Contains some acid phosphate of lime and starch; inferior quality.
1827	October 30, 1889	N. S. Hoff	Albany	99.61 per cent pure; good quality.
1828	October 30, 1889	G. E. Wilson	Albany	98.39 per cent pure; good quality.
1829	October 30, 1889	Cass Bros	Albany	97.73 per cent pure; good quality.
1830	October 30, 1889	Link & Becker	Albany	Chiefly tartaric acid, sulphate of lime and some starch; fictitious.
1831	October 30, 1889	C. T. Armatage	Albany	99.61 per cent pure; good quality.
1832	October 30, 1889	Ann Kelly	Albany	Mostly starch; some sulphate of lime; acidity equivalent to 10.65 per cent cream of tartar; inferior quality.

CREAM OF TARTAR — (*Concluded*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1833	October 30, 1889	D. Fitzpatrick	Albany	99.61 per cent pure; good quality.
1834	October 30, 1889	W. B. Groat	Albany	99.61 per cent pure; good quality.
1835	October 30, 1889	Underhill & Hatt	Albany	98.98 per cent pure; good quality.
1836	October 30, 1889	D. Adler	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.
1837	October 30, 1889	E. J. O'Connor	Albany	Chiefly acid phosphate of lime; a little starch; fictitious.
1838	October 30, 1889	J. A. LaGrange	Albany	Chiefly acid phosphate of lime; a little starch; fictitious.
1839	October 30, 1889	Thomas Callahan	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1840	October 30, 1889	J. Foley	Albany	Largely adulterated with sulphate of lime; 18.79 per cent cream of tartar; inferior quality.
1841	October 30, 1889	P. Kelly	Albany	98.98 per cent pure; good quality.
1842	October 30, 1889	T. H. Begnal	Albany	Chiefly acid phosphate of lime; some starch; fictitious.
1843	October 30, 1889	Owen Sweeney	Albany	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1844	October 30, 1889	H. Benink	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.
1845	October 30, 1889	G. B. Russell	Albany	Chiefly acid phosphate of lime and starch; fictitious.
1846	October 30, 1889	F. G. Bradley	Albany	Chiefly tartaric acid and sulphate of lime; fictitious.

1847	October 31, 1889	George Burkart	Albany ..	Chiefly acid phosphate of lime; fictitious.
1848	October 31, 1889	H. Albert, Jr.............	Albany ..	99.61 per cent pure; good quality.
1849	October 31, 1889	Winne Bros	Albany ..	Chiefly acid phosphate of lime and starch; fictitious.
1850	October 31, 1889	J. H. Smith	Albany ..	Chiefly acid phosphate of lime; a little starch; fictitious.
1851	October 31, 1889	A. Leitch	Albany ..	Chiefly tartaric acid and sulphate of lime; fictitious.
1852	October 31, 1889	G. H. Shoudy	Albany ..	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1853	October 31, 1889	Platto & Van Valkenburgh.	Albany ..	Chiefly tartaric acid and sulphate of lime; fictitious.
1854	October 31, 1889	E. P. Patten.........	Albany ..	Adulterated with sulphate of lime; acidity equivalent to 21.92 per cent cream of tartar; inferior quality.
1855	October 31, 1889	W. J. Maher..............	Albany ..	Contains some acid phosphate of lime and starch; inferior quality.
1856	October 31, 1889	J. McGowan...	Albany ..	97.73 per cent pure; good quality.
1857	October 31, 1889	Edward Delehanty........	Albany ..	Contains some acid phosphate of lime and starch; inferior quality.
1858	October 31, 1889	H. H. Slingerland & Son ..	Albany ..	Chiefly acid phosphate of lime; fictitious.
1859	October 31, 1889	John Horton	Albany ..	Chiefly acid phosphate of lime; fictitious.
1860	October 31, 1889	P. Becket	Albany ..	Chiefly acid phosphate of lime and starch; fictitious.
1861	October 31, 1889	M. J. McDonald	Albany ..	Chiefly tartaric acid, sulphate of lime and starch; fictitious.
1862	October 31, 1889	J. J. Scrafford	Albany ..	98.39 per cent pure; good quality.
1863	October 31, 1889	James Boyd...............	Albany ..	Chiefly acid phosphate of lime and starch; fictitious.

[illegible]

[illegible] is not stated in the [illegible]. As made by the [illegible] of the Pharmacopoeia of 1870, in which ether [illegible] more of the ethereal oil [illegible] the specific gravity [illegible]. The following table gives particulars concerning the samples examined:

COMPOUND SPIRIT OF ETHER, U. S. P.

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Specific gravity at sixty degrees Fahrenheit.	Quality.
1347	July 18, 1888	H. V. Roese	Buffalo	0.803	Inferior.
1348	July 18, 1888	E. J. Liebetrut	Buffalo	0.799	Inferior.
1349	July 18, 1888	Bontecou & Mosher	Buffalo	0.799	Inferior.
1350	July 18, 1888	Rieffenstahl Bros	Buffalo	0.809	Inferior.
1351	July 18, 1888	J. P. & J. W. Diehl	Buffalo	0.807	Inferior.
1385	July 20, 1888	O. B. Heyne.	Syracuse	0.807	Inferior.
1386	July 20, 1888	G. A. Heyne	Syracuse	0.825	Fair.
1387	July 21, 1888	E. B. Covert	Syracuse	0.809	Inferior.
1388	July 21, 1888	Dr. D. T. Whyborn	Syracuse	0 867	Inferior.
1389	July 21, 1888	C. W. Snow & Co	Syracuse	0.868	Inferior.
1390	July 21, 1888	Brown & Dawson.	Syracuse	0.854	Inferior.
1391	July 21, 1888	R. E. Smith	Syracuse	0.889	Inferior.
1392	July 21, 1888	J. C. Auchampaugh	Syracuse	....	Wrong label attached Consists of alcohol.
1477	March 26, 1889	C. M. Throop	Schoharie	0,910	Inferior.
1478	March 26, 1889	J. Dillenback	Cobleskill.	0.821	Fair.
1479	March 26, 1889	E. E. Ford	Oneonta	0.860	Inferior.
1480	March 26, 1889	T. E. Marsh	Oneonta	....	Labeled "Ether." Is a mixture of chloroform and alcohol.
1520	April 11, 1889	Chas. Whyland	St. Johnsville.	0.800	Inferior.
1536	May 14, 1889	D. F. Magill	Troy	0.858	Inferior.
1558	May 23, 1889	G. Steinführer*	Schenectady	0.803	Inferior.
1559	May 23, 1889	G. E. Duryee*	Schenectady	0.806	Inferior.

COMPOUND SPIRIT OF ETHER (*Continued*)

Number of sample	Date of collection	OF WHOM PURCHASED	Where purchased	Specific gravity at sixty degrees Fahrenheit	Quality
1560	May 23, 1889	Wm. Sauter*	Schenectady	0.800	Inferior
1561	May 23, 1889	W. T. Hanson & Co*	Schenectady	0.811	Inferior
1562	May 23, 1889	Van Zandt & Shaffer*	Schenectady	0.798	Inferior
1582	May 31, 1889	C. A. Whipple*	Troy	0.799	Good
1583	May 31, 1889	W. H. Flandrau*	Troy	0.802	Good
1584	May 31, 1889	E. F. Leahy*	Troy	0.807	Good
1585	May 31, 1889	M. A. Barnhart	Green Island	0.877	Inferior
1586	May 31, 1889	R. P. Tunnard	West Troy	0.872	Inferior
1644	June 14, 1889	L. H. Gaus	Albany	0.799	Inferior
1645	June 14, 1889	W. E. Manton	Albany	0.817	Inferior
1646	June 15, 1889	H. Miller	Albany	0.807	Inferior
1647	June 15, 1889	J. D. Palmatier	Albany	0.811	Inferior
1648	June 14, 1889	Turner Bros.	Albany	0.808	Good
1649	June 15, 1889	Charles Van Loon	Albany	0.805	Inferior
1706	June 21, 1889	W. L. Purple	Albany	0.800	Inferior
1707	June 22, 1889	J. M. Bandorf	Albany	0.804	Inferior
1708	June 24, 1889	George Boucher	Albany	0.810	Inferior.
1709	June 22, 1889	S. C. Hodgkins	Albany	0.809	Inferior
1710	June 22, 1889	E. F. Hunting	Albany	0.815	Inferior.
1711	June 24, 1889	William Palmatier	Albany	0.851	Inferior.
1712	June 22, 1889	E. T. Rice	Albany	0.827	Fair
1713	June 22, 1889	W. B. Sabey	Albany	0.808	Inferior.
1714	June 24, 1889	T. K. Perry	Albany	0.810	Fair.
1742	July 5, 1889	J. S. Beaudry	Bath-on-the-Hudson.	0.909	Inferior.

1743	July 5, 1889	J. H. Miller	Greenbush	0.846	Inferior.
1744	July 5, 1889	J. F. Munger	East Albany	0.865	Inferior.
1745	July 6, 1889	T. E. Walsh	Albany	0.881	Inferior.
1746	July 5, 1889	T. L. Green	Greenbush	0.873	Inferior.

* Second sample.

SPIRIT OF NITROUS ETHER. (*Spiritus Aetheris Nitrosi, U. S. P.*)

Two samples examined as described below, neither being of good quality. During the succeeding year it is proposed to collect and assay a large number of samples of this useful drug, which, on account of its general inferiority, is fast falling into disuse.

Number	Date of collection	OF WHOM PURCHASED	Where purchased	Specific gravity at 60 degrees Fahrenheit	Quality
1618	April 11, 1889	J. H. Smith	Little Falls	0.840	Fair
1619	April 11, 1889	H. G. Babcock & Co.	Little Falls	0.840	Fair

STRONGER ETHER — (*Aether Fortior, U. S. P.*).

Sixty-eight samples examined, of which there were of good quality, forty; fair, four; inferior, twenty-two, while one consisted of compound spirit of ether and one of sweet spirit of nitre, most carelessly sold for the article called for. This is an improvement over last year, but nevertheless is not a very good showing.

Two qualities of ether are recognized by the U. S. P., viz., "ether," specific gravity about 0.750, and containing about twenty-six per cent of alcohol, and "stronger ether," with a specific gravity not higher than 0.725, at fifteen degrees C., and containing about six per cent of alcohol. Stronger ether is generally used as an anæsthetic, and ought always to be kept in stock by the pharmacist. When it is called for by its officinal name in full it ought always to be supplied, and the substitution of common ether is entirely inexcusable, and betokens great carelessness or ignorance on the part of the seller. Particulars concerning these samples are appended:

[illegible]

[illegible]	May	[illegible] 1890	[illegible]*	Troy	0.797	Good.
[illegible]	May	[illegible] 1890	[illegible]	Schenectady		Consists of an inferior quality of compound spirit of ether. Error in sale.
[illegible]	May	[illegible] 1890	Van [illegible] and [illegible]	Schenectady	0.797	Good.
[illegible]	May	[illegible] 1890	C. A. Whipple*	Troy	0.794	Good
[illegible]	May	[illegible] 1890	Wm. [illegible]*	Cohoes	0.803	Inferior.
[illegible]	May	[illegible] 1890	[illegible]*	Cohoes	0.797	Good
[illegible]	May	[illegible] 1890	[illegible]*	Green Island	0.791	Good.
[illegible]	May	[illegible] 1890	[illegible] Miller*	West Troy	0.787	Inferior.
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.780	Inferior
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.797	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.793	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.796	Good
[illegible]	June	[illegible] 1890	[illegible] & Co.	Albany	0.794	Good
[illegible]	June	[illegible] 1890	[illegible] Hoffman	Albany	0.811	Inferior.
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.794	Good
[illegible]	June	[illegible] 1890	[illegible] Lloyd	Albany	0.795	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.795	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.793	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.793	Good
[illegible]	June	[illegible] 1890	[illegible] & [illegible]	Albany	0.795	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.744	Inferior.
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.795	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.796	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.795	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.831	Fair.
[illegible]	June	[illegible] 1890	[illegible] & [illegible]	Albany	0.798	Good
[illegible]	June	[illegible] 1890	[illegible]	Albany	0.796	Good.

* Second sample.

STRONGER ETHER, U. S. P. (*Concluded*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Specific gravity at sixty degrees Fahrenheit.	Quality.
1659	June 22, 1889	H. B. Clement & Co	Albany	0.724	Good.
1660	June 24, 1889	Dalrymple & Warner	Albany	0.746	Inferior.
1661	June 22, 1889	C. H. Gaus	Albany	0.725	Good.
1662	June 24, 1889	A. L. George	Albany	0.728	Fair.
1663	June 22, 1889	A. B. Huested & Co	Albany	0.725	Good.
1664	June 22, 1889	A. R. Miller	Albany	0.726	Good.
1665	June 24, 1889	T. W. Nellis	Albany	0.725	Good.
1666	June 22, 1889	E. T. Rice	Albany	0.725	Good.
1667	June 22, 1889	C. H. Smith & Co	Albany	0.728	Fair.
1668	June 24, 1889	F. J. Smith	Albany	0.724	Good.
1669	June 22, 1889	Wm. Sautter	Albany	0.724	Good.
1719	July 5, 1889	Wm. Herrington	Greenbush	0.761	Inferior.
1720	July 5, 1889	J. H. McIntyre	East Albany	0.745	Inferior.
1721	July 5, 1889	J. H. Miller	Greenbush	0.749	Inferior.
1722	July 6, 1889	J. DeP. Townsend	Albany	0.725	Good.
1723	July 5, 1889	D. Donnelly	East Albany	0.739	Inferior.
1724	July 6, 1889	G. R. Cardwell	Albany	0.724	Good.

DILUTED HYDROBROMIC ACID — (*Acidum Hydrobromicum Dilutum, U. S. P.*).

Thirty-eight samples examined, of which there were of good quality twenty-five; fair, one; inferior, six, and of excessive strength, six. The Pharmacopœia requires ten per cent of the absolute acid. These samples varied between 3.8 and 21.7 per cent. Omitting the six of excessive strength, the remaining thirty-two averaged 9.8 per cent, but the individual samples will be seen, by reference to the following table, to present wide variations:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Per cent.	Quality.
1393	July 20, 1888	G. A. Heyne	Syracuse	10.80	Good.
1444	March 9, 1889	C. W. Striker	Amsterdam	5.50	Inferior.
1445	March 9, 1889	Powell & Gilbert	Amsterdam	21.70	Excessive strength.
1446	March 9, 1889	E. W. Clark	Amsterdam	10.60	Good.
1447	March 9, 1889	Joseph Donnelly	Amsterdam	10.80	Good.
1448	March 9, 1889	J. A. Barkhuff	Amsterdam	9.20	Good.
1449	March 9, 1889	N. C. Becker	Amsterdam	3.80	Inferior.
1495	April 11, 1889	G. H. Ingraham	Amsterdam	17.20	Excessive strength.
1496	April 11, 1889	E. S. Gregory	Fort Plain	13.80	Good.
1497	April 11, 1889	A. Woolever	Little Falls	11.00	Good.
1531	May 14, 1889	C. H. Wiberley	Troy	13.20	Excessive strength.
1532	May 14, 1889	F. M. Brower	Troy	12.40	Good.
1533	May 14, 1889	H. Gnadendorff	Troy	9.80	Good.
1534	May 14, 1889	E. W. Stoddard	Troy	8.80	Fair.
1535	May 14, 1889	L. Barton & Co	Troy	12.40	Good.
1566	May 23, 1889	A. T. Veeder	Schenectady	4.70	Inferior.
1591	May 31, 1889	Wm. Brown	Cohoes	16.60	Excessive strength.

DILUTED HYDROBROMIC ACID — (Concluded).

Number of sample.	Date of collection.	Of whom purchased.	Where purchased.	Per cent.	Quality.
1592	May 31, 1889	P. H. Spillane	Cohoes	12.50	Good.
1632	June 14, 1889	W. S. Elmendorf	Albany	7.00	Inferior.
1633	June 15, 1889	E. Harden	Albany	10.60	Good.
1634	June 15, 1889	T. J. Lewi	Albany	10.20	Good.
1635	June 15, 1889	C. E. Lloyd	Albany	10.20	Good.
1636	June 15, 1889	Orsor & Poole	Albany	4.20	Inferior.
1637	June 14, 1889	L. Sautter	Albany	10.40	Good.
1688	June 21, 1889	Geo. Boucher	Albany	10.40	Good.
1689	June 22, 1889	S. C. Bradt	Albany	12.50	Good.
1690	June 22, 1889	H. B. Clement & Co.	Albany	10.80	Good.
1691	June 21, 1889	Dalrymple & Warner	Albany	9.20	Good.
1692	June 22, 1889	C. H. Gaus	Albany	10.20	Good.
1693	June 22, 1889	A. B. Huested & Co.	Albany	10.00	Good.
1694	June 22, 1889	A. R. Miller	Albany	16.00	Excessive strength.
1695	June 24, 1889	T. W. Nellis	Albany	12.50	Good.
1696	June 22, 1889	E. T. Rice	Albany	12.00	Good.
1697	June 22, 1889	C. H. Schaeffer	Albany	10.40	Good.
1698	June 24, 1889	F. J. Smith	Albany	5.20	Inferior.
1699	June 22, 1889	Wm. Sautter	Albany	10.80	Good.
1735	July 6, 1889	J. DeP. Townsend	Albany	11.40	Good.
1736	July 6, 1889	T. E. Walsh	Albany	14.00	Excessive strength.

Diluted Hydrochloric Acid — (*Acidum Hydrochloricum Dilutum, U. S. P.*).

Ten samples examined, of which four were of good quality; four were fair, and two of inferior strength. The Pharmacopœia requires ten per cent of the absolute acid. These samples ranged from 4.40 to 11.20 per cent, as shown in the table, and averaged 8.4 per cent.

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Per cent.	Quality.
1342	July 17, 1888	E. J. Smith	Buffalo	7.60	Fair.
1343	July 17, 1888	W. G. Gregory	Buffalo	8.40	Fair.
1344	July 17, 1888	C. M. Lyman	Buffalo	4.40	Inferior.
1345	July 17, 1888	T. M. Johnson	Buffalo	7.60	Fair.
1346	July 18, 1888	E. G. Boysen	Buffalo	9.20	Good.
1399	July 21, 1888	W. B. Bissell	Syracuse	11.20	Good.
1400	July 21, 1888	Charles Hubbard & Co.	Syracuse	9.60	Good.
1401	July 21, 1888	H. E. Richardson	Syracuse	6.60	Inferior.
1402	July 21, 1888	W. D. Tallman	Syracuse	11.20	Good.
1403	July 21, 1888	W. B. Fuller	Syracuse	8.40	Fair.

IPECAC — (*Ipecacuanha, U. S. P.*).

Five samples examined of the powdered drug, of which all but one were of good quality as shown below:

Number of samples.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1422	July 21, 1888	C. H. Sherwood	Syracuse	Good.
1423	July 21, 1888	F. C. Joslin & Co.	Syracuse	Good.
1424	July 21, 1888	W. R. Pratt	Syracuse	Good.
1425	July 21, 1888	F. E. Champlin & Co	Syracuse	Good.
1426	July 21, 1888	Bibbens & Sherman	Syracuse	Fair.

DILUTED NITRIC ACID — (*Acidum Nitricum Dilutum, U. S. P.*).

Four samples tested of which one was of good quality and three were of excessive strength. The Pharmacopœia requires ten per cent of the absolute acid. The percentage strengths of the samples examined are given in the following table and varied from 9.30 to 16.70 per cent:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Per cent.	Quality.
1398	July 21, 1888	Darwin Derby	Syracuse	13.40	Excessive strength.
1530	May 14, 1889	D. F. Magill	Troy	15.80	Excessive strength.
1589	May 31, 1889	M. McDermott	Cohoes	16.70	Excessive strength.
1705	June 22, 1889	S. C. Hodgkins	Albany	9.30	Good.

TARTRATE OF POTASSIUM AND SODIUM — (*Potassii et Sodii Tartras, U. S. P.*).

Three samples examined all of good quality as shown below.

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1464	March 9, 1889	E. W. Clark	Amsterdam	Good.
1465	March 9, 1889	Bradford & Dickinson	Amsterdam	Good.
1466	March 9, 1889	J. A. Barkhuff	Amsterdam	Good.

IODIDE OF POTASSIUM — (*Potassii iodidum, U. S. P.*).

Eight samples examined, of which three were of good and five of fair quality. The latter either possessed too great an alkalinity or contained the sulphate or other impurities in too great quantity to comply with the pharmacopœial requirements. The samples are described in the following table:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1475	March 26, 1889	C. M. Throop	Schoharie	Good.
1476	March 26, 1889	Jonas Dillenbeck	Cobleskill	Fair.
1502	April 11, 1889	M. W. Reid	Amsterdam	Fair.
1503	April 11, 1889	J. H. Smith	Little Falls	Fair.
1504	April 11, 1889	E. I. Stinson	Little Falls	Fair.
1505	April 11, 1889	W. S. Briggs	Fonda	Good.
1506	April 11, 1889	Charles Whyland	St. Johnsville	Fair.
1554	May 14, 1889	W. H. Wilkinson	Troy	Good.

SAFFRON—(*Crocus*, *U. S. P.*).

Twenty-one samples examined, of which two were of good quality; one was of fair quality and of the remaining number seventeen consisted of "safflower" (*Carthamus tinctorius*) and one of "crocus martis," or red oxide of iron. Concerning the substitution of safflower for saffron I quote from my last annual report: "The saffron of the Pharmacopœia consists of the stigmas of *Crocus sativus* and is often known in the trade as Spanish saffron or true saffron. No other kind of saffron is recognized in the Pharmacopœia and when it is called for by its officinal name no other article should be substituted for it. Safflower is very cheap and is often called for, verbally, as a domestic remedy under the name of saffron but when the demand is for the pharmacopœial drug it should not be dispensed. At all events, if offered in its stead, the substitution should be explained, but no such explanation was made in any of the above cases." A description of the samples is appended:

CROCUS — (*Saffron, U. S. P.*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1416	July 21, 1888	C. H. Sherwood	Syracuse	Consists of safflower; error in sale.
1417	July 21, 1888	F. C. Joslin & Co	Syracuse	Consists of safflower; error in sale.
1418	July 21, 1888	W. R. Pratt	Syracuse	Consists of safflower; error in sale.
1419	July 21, 1888	F. E. Champlin & Co	Syracuse	Consists of safflower; error in sale.
1420	July 21, 1888	S. D. Devoe	Syracuse	Consists of safflower; error in sale.
1421	July 21, 1888	Corsaw & Barnum	Syracuse	Consists of safflower; error in sale.
1489	April 11, 1889	Bradford & Dickinson*	Amsterdam	Consists of safflower; error in sale.
1490	April 11, 1889	G. H. Ingraham*	Amsterdam	Consists of safflower; error in sale.
1491	April 11, 1889	C. W. Striker*	Amsterdam	Fair quality.
1546	May 14, 1889	W. H. Wilkinson	Troy	Consists of safflower; error in sale.
1547	May 14, 1889	F. M. Brower*	Troy	Consists of safflower; error in sale.
1548	May 14, 1889	H. Gnadendorff	Troy	Good.
1549	May 14, 1889	E. W. Stoddard*	Troy	Consists of safflower; error in sale.
1550	May 14, 1889	L. Burton & Co.*	Troy	Consists of safflower; error in sale.
1551	May 14, 1889	C. H. Bosworth*	Troy	Consists of safflower; error in sale.
1552	May 14, 1889	G. W. Holcomb	Troy	Consists of safflower; error in sale.
1553	May 14, 1889	Drake & Moffitt*	Troy	Consists of safflower; error in sale.
1567	May 23, 1889	Wm. Sauter*	Schenectady	Consists of safflower; error in sale.
1568	May 23, 1889	W. T. Hanson & Co.*	Schenectady	Consists of safflower; error in sale.
1569	May 23, 1889	A. T. Veeder*	Schenectady	Good.
1570	May 23, 1889	Van Zandt & Shaffer*	Schenectady	Consists of crocus martis; error in sale.

*Second sample.

SANTONIN.—(*Santoninum, U. S. P.*).

Four samples examined, all of good quality as follows:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1467	March 9, 1889	Warnick & Reid	Amsterdam	Good.
1468	March 9, 1889	G. H. Ingraham	Amsterdam	Good.
1469	March 9, 1889	Joseph Donnelly	Amsterdam	Good.
1470	March 9, 1889	N. C. Becker	Amsterdam	Good.

COMPOUND EFFERVESCING POWDER — (*Pulvis Effervescens Compositus, U. S. P.*).

Seven samples examined, of which four were of good weight and quality; two were rated as fair, the contents of the blue paper being about one-fifth short; and one as inferior, the blue paper being twenty-six per cent short weight. Seidlitz powders are generally measured and not weighed, and while it is by no means necessary that they be made with great accuracy, the contents of the papers should certainly not vary to exceed twenty per cent. Particulars concerning the samples are appended:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1473	March 26, 1889	Alfred Parrott	Schoharie	Good weight and quality.
1474	March 26, 1889	E. R. Ford	Oneonta	Blue paper 20% short; fair.
1498	April 11, 1889	M. W. Reid	Amsterdam	Good weight and quality.
1499	April 11, 1889	E. I. Stinson	Little Falls	Blue paper 17% short; fair.
1500	April 11, 1889	M. McIntyre	Fonda	Blue paper 26% short; inferior.
1501	April 11, 1889	S. Walrath	St. Johnsville	Good weight and quality.
1555	May 14, 1889	W. H. Wilkinson	Troy	Good weight and quality.

PRECIPITATED SULPHUR — (*Sulphur Præcipitatum, U. S. P.*).

Thirty-one samples examined, of which but six were of good quality; two were of fair quality; seventeen were of inferior quality, one of these being strongly acid and the others containing large quantities of sulphate of lime, while six consisted of washed sulphur ignorantly or carelessly sold for precipitated sulphur. Concerning this article I quote from my last annual report: "The sale of common *lac sulphur* for the officinal precipitated sulphur is entirely inexcusable. It is loaded with sulphate of lime, and since precipitated sulphur of good quality is easily obtainable in the market, at a slightly higher price, this substitution ought never to be made; but the above results show that the proper article was sold in less than half the cases. Pharmacists ought to be familiar with the various grades of the medicinal articles in which they deal, and a good result will be accomplished if, by calling attention to errors of this kind, an improvement in this respect can be brought about. The tests by which genuine precipitated sulphur can be distinguished from the impure commercial article are laid down in the Pharmacopœia, and are easily applied by the retailer. In this case, however, he hardly needs even to make a test, for the price he pays and name under which he buys sufficiently indicate the quality of the article supplied him." The following table gives a description of the samples:

PRECIPITATED SULPHUR, U. S. P.

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1434	July 21, 1888	P. L. Ryan & Co.	Syracuse	Consists of washed sulphur; error in sale.
1435	July 21, 1888	J. C. Bowe	Syracuse	Consists of washed sulphur; error in sale.
1436	July 21, 1888	E. A. Eaton	Syracuse	Largely adulterated with sulphate of lime; inferior quality.
1437	July 21, 1888	J. W. Young & Co	Syracuse	Largely adulterated with sulphate of lime; inferior quality.
1438	July 21, 1888	E. B. Covert	Syracuse	Largely adulterated with sulphate of lime; inferior quality.
1439	July 21, 1888	Smith & Dalton	Syracuse	Consists of washed sulphur; error in sale.
1440	July 21, 1888	Newton & Hickock	Syracuse	Good.
1441	July 21, 1888	W. B. Bissell	Syracuse	Strongly acid; inferior quality.
1442	July 21, 1888	S. D. Devoe	Syracuse	Largely adulterated with sulphate of lime; inferior quality.
1443	July 21, 1888	Corsaw & Barnum	Syracuse	Good.
1541	May 14, 1889	C. H. Shacklady*	Troy	Largely adulterated with sulphate of lime; inferior quality.
1542	May 14, 1889	R. H. Starbuck*	Troy	Largely adulterated with sulphate of lime; inferior quality.
1543	May 14, 1889	C. H. Bosworth*	Troy	Good.
1544	May 14, 1889	G. W. Holcomb	Troy	Largely adulterated with sulphate of lime; inferior quality.
1545	May 14, 1889	Drake & Moffitt*	Troy	Largely adulterated with sulphate of lime; inferior quality.
1571	May 23, 1889	W. T. Hanson & Co*	Schenectady	Largely adulterated with sulphate of lime; inferior quality.

PRECIPITATED SULPHUR — (*Continued*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1572	May 23, 1889	A. T. Veeder*	Schenectady	Good.
1573	May 23, 1889	H. A. Kerste	Schenectady	Largely adulterated with sulphate of lime; inferior quality.
1595	May 31, 1889	R. P. Tunnard*	West Troy	Largely adulterated with sulphate of lime; inferior quality.
1597	May 31, 1889	J. E. Miller*	West Troy	Good.
1650	June 14, 1889	G. E. Ferguson	Albany	Fair.
1651	June 15, 1889	F. W. Hoffman	Albany	Good.
1652	June 15, 1889	William McAllaster	Albany	Consists of washed sulphur; error in sale.
1653	June 15, 1889	H. Miller	Albany	Largely adulterated with sulphate of lime; inferior quality.
1654	June 15, 1889	Charles Van Loon	Albany	Largely adulterated with sulphate of lime; inferior quality.
1715	June 22, 1889	S. C. Hodgkins	Albany	Largely adulterated with sulphate of lime; inferior quality.
1716	June 22, 1889	E. F. Hunting	Albany	Largely adulterated with sulphate of lime; inferior quality.
1717	June 24, 1889	William Palmatier	Albany	Fair.
1718	June 22, 1889	W. B. Sabey	Albany	Largely adulterated with sulphate of lime; inferior quality.
1747	July 5, 1889	William Herrington	Greenbush	Consists of washed sulphur; error in sale.
1748	July 5, 1889	J. F. Munger	East Albany	Consists of washed sulphur; error in sale.

WASHED SULPHUR — (*Sulphur Lotum, U. S. P.*).

Fifteen samples examined of which twelve were of good quality; one was of inferior quality not being washed at all but possessing all the natural acidity of the common flowers of sulphur, and two consisted of precipitated sulphur of inferior quality, sold through ignorance or carelessness for washed sulphur which was called for in writing. I quote from my last annual report: "Washed sulphur is one of the articles which has been selected for examination, not because it is a very important drug, but to test the carefulness and reliability of the dealer. The natural acidity of commercial sublimed sulphur or flowers of sulphur is removed by treatment with ammonia and subsequent washing, and as it is easily prepared by the retailer or obtained from reliable dealers, there is no reason why another article should be substituted for it or an impure article be sold."

WASHED SULPHUR, U. S. P.

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Quality.
1427	July 21, 1888	E. S. Petrie	Syracuse	Good.
1428	July 21, 1888	L. H. Hollon	Syracuse	Good.
1429	July 21, 1888	Charles Hubbard & Co	Syracuse	Good.
1430	July 21, 1888	D. Derby	Syracuse	Good.
1431	July 21, 1888	H. E. Richardson	Syracuse	Good.
1432	July 21, 1888	W. D. Tallman	Syracuse	Inferior.
1433	July 21, 1888	W. B. Fuller	Syracuse	Good.
1537	May 14, 1889	C. H. Wiberly*	Troy	Good.
1538	May 14, 1889	F. M. Brower*	Troy	Good.
1539	May 14, 1889	H. Schneider	Troy	Good.
1540	May 14, 1889	D. F. Magill*	Troy	Good.
1574	May 23, 1889	H. A. Kerste	Schenectady	Good.
1593	May 31, 1889	A. G. Kiffin*	Green Island	Consists of precipitated sulphur of inferior quality. Error in sale.
1594	May 31, 1889	M. A. Barnhart	Green Island	Good quality.
1596	May 31, 1889	J. L. Wright	West Troy	Consists of precipitated sulphur of inferior quality. Error in sale.

*Second sample.

DILUTED SULPHURIC ACID — (*Acidum Sulphuricum Dilutum, U. S. P.*).

Fifty-three samples examined, of which thirty-eight were of good quality; five were of fair and one of inferior quality, while nine possessed excessive strength. The diluted acid of the Pharmacopœia should contain ten per cent of the officinal sulphuric acid and have a specific gravity of about 1.067. These samples varied from 7 to 24.80 per cent. Excluding the nine samples of excessive strength the average for the remainder was 10.02 per cent. The following table gives a description of the samples:

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Per cent.	Quality.
1404	July 21, 1888	C. H. Sherwood	Syracuse	9.60	Good.
1405	July 21, 1888	W. R. Pratt	Syracuse	12.00	Good.
1406	July 21, 1888	F. E. Champlin & Co.	Syracuse	7.00	Inferior.
1407	July 21, 1888	Bibbens & Sherman	Syracuse	10.00	Good.
1529	May 14, 1889	Noncrief & Francis	Troy	9.60	Good.
1588	May 31, 1889	M. McDermott	Cohoes	10.80	Good.
1613	June 14, 1889	W. S. Elmendorf	Albany	17.50	Excessive strength.
1614	June 14, 1889	G. E. Ferguson	Albany	9.40	Good.
1615	June 14, 1889	L. H. Gaus	Albany	16.30	Excessive strength.
1616	June 15, 1889	Eugene Harden	Albany	22.00	Excessive strength.
1617	June 14, 1889	J. W. Heller	Albany	14.10	Excessive strength.
1618	June 15, 1889	F. W. Hoffman	Albany	18.40	Excessive strength.
1619	June 15, 1889	T. J. Lewi	Albany	9.90	Good.
1620	June 15, 1889	C. E. Lloyd	Albany	10.30	Good.
1621	June 15, 1889	Arch. Gilbert	Albany	10.70	Good.
1622	June 14, 1889	W. E. Masten	Albany	10.00	Good.
1623	June 15, 1889	Wm. McAllaster	Albany	8.10	Fair.

DILUTED SULPHURIC ACID—(*Concluded*).

Number of sample.	Date of collection.	OF WHOM PURCHASED.	Where purchased.	Per cent.	Quality.
1624	June 15, 1889	H. Miller	Albany	9.80	Good.
1625	June 15, 1889	Orsor & Poole	Albany	9.40	Good.
1626	June 15, 1889	J. D. Palmatier	Albany	9.80	Good.
1627	June 15, 1889	Otto Ritzman	Albany	9.50	Good.
1628	June 14, 1889	L. Sautter	Albany	9.20	Good.
1629	June 14, 1889	Otto Scholz	Albany	9.40	Good.
1630	June 14, 1889	Turner Bros	Albany	12.50	Good.
1631	June 15, 1889	Charles Van Loon	Albany	8.80	Fair.
1670	June 24, 1889	W. L. Purple	Albany	24.80	Excessive strength.
1671	June 22, 1889	J. M. Bandorf	Albany	11.40	Good.
1672	June 22, 1889	Bassett & Brumaghim	Albany	10.40	Good.
1673	June 22, 1889	S. C. Bradt	Albany	12.50	Good.
1674	June 22, 1889	H. B. Clement & Co	Albany	12.00	Good.
1675	June 24, 1889	Dalrymple & Warner	Albany	10.20	Good.
1676	June 22, 1889	C. H. Gaus	Albany	11.20	Good.
1677	June 24, 1889	A. L. George	Albany	9.60	Good.
1678	June 22, 1889	A. B. Huested & Co	Albany	10.20	Good.
1679	June 22, 1889	E. F. Hunting	Albany	8.80	Fair.
1680	June 22, 1889	A. R. Miller	Albany	9.80	Good.
1681	June 24, 1889	T. W. Nellis	Albany	10.20	Good.
1682	June 24, 1889	Wm. Palmatier	Albany	10.40	Good.
1683	June 22, 1889	W. B. Sabey	Albany	20.80	Excessive strength.
1684	June 22, 1889	C. H. Schaeffer	Albany	10.80	Good.
1865	June 22, 1889	C. H. Smith & Co	Albany	9.60	Good.

1686	June 24, 1889	F. J. Smith	Albany	10.00	Good.
1687	June 22, 1889	Wm. Sautter	Albany	9.60	Good.
1725	July 5, 1889	J. S. Beaudry	Bath-on-the-Hudson.	10.80	Good.
1726	July 5, 1889	Wm. Herrington	Greenbush	9.60	Good.
1727	July 5, 1889	J. H. McIntyre	East Albany	17.80	Excessive strength.
1728	July 5, 1889	J. H. Miller	Greenbush	15.20	Excessive strength.
1729	July 5, 1889	J. F. Munger	East Albany	8.00	Fair.
1730	July 6, 1889	J. DeP. Townsend	Albany	10.00	Good.
1731	July 6, 1889	T. E. Walsh	Albany	9.00	Good.
1732	July 5, 1889	T. L. Green	Greenbush	8.80	Fair.
1733	July 5, 1889	D. Donnelly	East Albany.	12.20	Good.
1734	July 6, 1889	G. R. Cardwell	Albany	10.20	Good.

During the period covered by this report eleven samples of water have been analyzed which were sent from the following places: Richfield Springs, three samples; Kingston, two samples; Saugerties, two samples; West Troy, one sample; Philmont, two samples; locality not stated, one sample. One sample of candy thought to contain tartar emetic or other mineral poison and one sample of corn meal said to have produced illness were examined with negative results. A report on the healthfulness of cottonseed oil, beef stearine and compound lards was made in May and opinions on various chemical questions have been given from time to time.

The total number of samples of drugs examined by me since September 1, 1885, when work was begun on the present plan, has been 1,863, an average of over thirty-seven samples for each month during which the work has been carried on. A considerable number of second samples (marked as such in the tabulated reports) were collected during the past year from dealers whose goods had been found to be of inferior quality. In many, though by no means in all, cases it will be seen the first notifications had been heeded. The work done during the past four years has received the hearty commendation of both manufacturers and leading dealers throughout the State and is believed to have had an important influence in improving the quality of the drugs dispensed and in inciting dealers to greater carefulness in their preparation and sale. In my opinion if the work is to be continued it should be upon essentially the same plan as that heretofore pursued. New localities should be visited; a wider range of samples collected and second samples obtained from a greater number of dealers where the first has been found of inferior quality. The majority of respectable pharmacists are innocent of any desire to violate the law by the sale of inferior or adulterated drugs and to secure the correction of the errors they commit, which are more frequently the result of ignorance than of design, they need, as a rule, only to be informed of them. Therefore it is believed that a general compliance with the law may ere long be secured without resorting to legal proceedings or interfering in an arbitrary manner with any legitimate industry.

All of which is respectfully submitted.

WILLIS G. TUCKER,
Analyst.

CHEMICAL LABORATORY OF THE ALBANY MEDICAL COLLEGE,
ALBANY, N. Y., *January* 1, 1890.

CHEMICAL LABORATORY OF THE ALBANY MEDICAL COLLEGE,
ALBANY, *May* 6, 1889.

DR. LEWIS BALCH, *Secretary of the State Board of Health of New York, Albany:*

DEAR SIR.— On the twenty-sixth of April you requested me to make such examination of "lard and lard compounds, or products into which cottonseed oil enters as a component part," and of "cottonseed oil as sold for edible purposes," as might be possible in the time intervening between that date and this day, and to report to you whether, in my opinion, such "lard, lard compounds or products are healthful or nutritious or are in any degree deleterious or injurious to health" and "whether or not said (cottonseed) oil is nutritious or healthful, or is in any degree deleterious or injurious to health."

The time at my disposal, thus allowed me, has not been sufficient to admit of the systematic collection of samples of the articles named or the elaborate analysis of such samples as have been collected, and this necessarily brief report, therefore, deals with the questions involved chiefly in a general manner, and is, in the main, based on information acquired in previous investigations and by former study of the subjects considered.

The main question as I understand it is, whether cottonseed oil properly extracted and refined is a wholesome and nutritious article of food, and whether it is a proper substance to mingle with lard obtained from the fat of hogs or with other fats in the manufacture of "lard compounds," table oil and the like for use as food, or in the preparation or manufacture of food articles. There doubtless exists on the part of many people a prejudice that lard should be made from hog fat alone and table or salad-oil from the fruit of the olive-tree solely but this opinion is in reality based on no good or sufficient reasons. Fats obtained from a variety of animals and a great number of plants have been used from time immemorial in the preparation of food and it is unreasonable to suppose that those particular fats and oils which we, in this country, or in this part of the country, have been accustomed to use are the only suitable ones to employ. All over the world vegetable oils are obtained by the expression of seeds or fruits of plants and used as food. From the cocoanut, Brazilian nut, walnut, almond and a wide variety of other vegetable products oils are extracted and employed in the preparation

of food. In speaking of the vegetable oils Dr. Edward Smith in his well-known work on "Foods" places cottonseed oil at the head of the list and says: "There can be no doubt that we have in this product of seeds and plants, which seem otherwise to be useless, a great storehouse of most valuable nutritive material; and if we know but little of them in this climate, it is because we have the olive oil at hand and are bountifully supplied with many kinds of animal fats. It is, however, probable that the cheapness of some of these vegetable oils, in addition to the delicacy of their flavor will, ere long, force themselves into notice and obtain a place among our foods." This was written in 1873 when the manufacture of cottonseed oil was still in its infancy. Professor Wiley, chemist to the United States department of agriculture in bulletin No. 13 on "Foods and Food Adulterants" quotes from Allen's well-known and standard work on "Commercial Organic Analysis," as follows: "Refined cottonseed oil is of a straw or golden-yellow color, or occasionally, nearly colorless. The density ranges from .922 to .926 and the solidifying point from one to ten degrees centigrade. Refined cottonseed oil is usually very free from acid, and when properly prepared is of pleasant taste, and admirably adapted for edible and culinary purposes, for which it is now extensively employed, both with and without its nature being acknowledged." As regards the manufacture and refining of cottonseed oil, it may be remarked that the methods employed are not materially different from the processes made use of in the preparation of olive oil. That cottonseed oil has for years been exported to Italy and France, in which countries it is largely employed for mixing with olive oil, is a well-known fact. Speaking of cottonseed oil, Dunham J. Crain, United States Consul at Milan, reported as follows under date of November 10, 1883: "The seed oil industry is assuming considerable proportions. Several kinds of this oil were exhibited at the Milan exhibition in 1881, and classed among alimentary oils. There were some beautiful specimens of sesame oil exhibited. * * * The importation of cottonseed oil was arrested in 1882, since which the demand for oleaginous seeds has increased. It is therefore urged that a duty should be imposed on all imports of seeds and seed oil, if it is to be continued on cottonseed oil. It is claimed that the duty on cottonseed oil has served no good purpose; that the mixing of cotton oil with olive

oil was not prejudicial to health, and that the mixture is now made with oils from flax and nuts, and that the competition formerly coming from cotton oil has been replaced by oils of other seeds and by nut oils. * * * It is felt that frauds will diminish, and the public good be promoted, when prejudices against good seed oils disappear and they are sold under their true names." (United States Consular Reports, XII, 587.)

I am clearly of the opinion that cottonseed oil, whether used alone or commingled with other oils or fats, is a perfectly wholesome and nutritious food and as easily digested and assimilated as any of the commonly employed fats. In support of this view the opinion of numberless writers upon the subject and of experts in chemistry and physiology might be adduced, but I shall content myself with citing two or three. Battershall in his treatise on "Food Adulteration" remarks: "As a result of the publicity lately given to the subject of food adulteration, a popular impression has been produced that any substance employed as an adulterant of, or a substitute for another, is to be avoided *per se*. Perhaps the common belief that for all purposes cottonseed oil is inferior to olive oil and oleomargarine to butter, is the most striking illustration of this tendency. Now, as a matter of fact, pure cottonseed oil, as at present found on the market, is less liable to become rancid than the product of the olive, and, for many culinary uses, it is at least quite as serviceable. * * * The sale of these products, *under their true name*, should not only be allowed, but under some circumstances even encouraged."

Professor Wiley stated before the United States house committee on agriculture at the hearing on the compound lard bill in 1888, in reply to the question whether from his knowledge of chemistry and of medicine there is any property in cottonseed oil injurious to health, that there was not so far as he knew. In reply to the question, "Does that statement also apply to beef stearine used in connection with cottonseed oil in the manufacture of refined lard?" he replied, "Yes, sir; so far as I know there is nothing in it injurious to health." Concerning its digestibility and the ease with which it is assimilated he instanced a case in which a pint had been given as a laxative and had undergone perfect digestion showing in his opinion "that it was very easily acted upon by the intestinal juices" and "very easily

assimilated," and he added that "it seems to act on the digestive organs like olive oil precisely." In response to the question, "Are the nutritive qualities of cottonseed oil equal to the nutritive qualities of pure lard?" he replied, "I should say that there would be little difference as far as nutritive properties are concerned." Professor Wiley analyzed a large number of samples of so-called refined lards compounded chiefly of beef stearine, cottonseed oil and hog fat, and in response to the question, "Have you any belief that any of these articles or specimens * * * when used as foods are hurtful or unhealthful to the human system?" replied, "I have no reason to believe any of them are, any of the ingredients in the lards." And again, "As far as medical and chemical knowledge extends, these substances are not injurious to health." In reply to the question, "What would you say of cottonseed oil when used alone as an article of food?" he answered, "I should say that it was perfectly wholesome," and he gave it as his belief that it was as wholesome as olive oil, or hog lard or beef fat. Professor S. P. Sharpless, State Assayer for Massachusetts, and a chemist who has given much time to the study of food adulteration, stated during the course of the same investigation, that he knew of no property injurious to health in cottonseed oil or the refined lards which he had examined. Professor R. Ogden Doremus of New York city, states that refined lard made from steam lard, beef stearine and cottonseed oil is "pure and wholesome" and that in his opinion "cottonseed oil is a wholesome article of diet" and Professor L. M. Norton of the Massachusetts Institute of Technology, states that the compound lard made by a well-known firm is "a perfectly good food material" and "is unobjectionable in every respect, and does not contain anything which can be injurious to health."

These are the opinions which seem to be almost universally held by those who have investigated this subject from a scientific standpoint. So far as I know there is no evidence worthy of the name which even remotely tends to show that cottonseed oil is not a wholesome and nutritious food. It has, as a matter of fact, been used for years, both surreptitiously mixed with other oils and fats or openly employed on its merits as a palatable and useful food. Throughout the cotton-growing States it has been, for a long time, very largely used and the medical faculty of the Arkansas University state that it is to be preferred to other fats

in many respects, "agreeing with the most delicate stomachs whether used in baking or frying," and that "not one instance has ever been given of health being in any manner impaired by the use however free of cottonseed oil in food." They state that "thousands of hands employed in the cottonseed oil mills are in the habit of making their dinners on the crude oil, by dipping their bread in it, and some of them actually drink it, and yet from this free use of it nothing has ever resulted but the best of health."

Such testimony as that given above is not easily overthrown. Writers of eminence in our scientific, medical and agricultural journals have borne similar testimony and large numbers of people in our midst to-day use, by preference, in their households a cottonseed oil lard in place of one made from the fat of the hog. In my own family I have employed such a lard with perfect satisfaction, and am convinced by actual trial that it is palatable, readily digestible and a wholesome, nutritious article. During the last few years I have chemically examined a considerable number of compounded lards, sold as lard and under various trade names, containing cottonseed oil, sometimes without a trace of hog fat, and I have also examined various qualities and grades of cottonseed oil and of olive oil containing it, some of these examinations having been made within the last week, and I have discovered in these lard compounds and oils no substance injurious to health or in any way deleterious, and I am decidedly of the opinion that such lard compounds and cottonseed oil products as I have examined or of which I have knowledge are wholesome and nutritious articles of food.

Yours respectfully.

WILLIS G. TUCKER,

Analyst State Board of Health.

REPORT

OF

PROF. G. C. CALDWELL,

PUBLIC ANALYST.

Dr. LEWIS BALCH, *Secretary of the State Board of Health:*

SIR.—I submit herewith the report of my work as analyst of the board for the year 1889:

The results have been reported to you month by month through the year on the examination of 275 samples of alkaloidal preparations, 7 samples of canned vegetables and 5 samples of kerosene. These samples were bought in open market as usual in the cities (except New York and Brooklyn), and some of the larger towns of the State. Every sample of alkaloidal preparation is labeled by the druggist of whom it is purchased, giving his own firm name and the name of the manufacturer. All samples are sealed with sealing-wax and delivered to me in that condition.

The collector is usually treated courteously, and only in a few instances rudely. In one case, as reported to you at the time, a druggist refused to sell anything to him, while cognizant of the object of the desired purchase, thus acting in direct violation of section six of the law. The same thing has happened again in another city, on a collecting tour made while this report was in course of preparation. It does not seem to me that it is wise to allow such defiance of the law to pass unnoticed.

My monthly reports to you have been, as heretofore, classified as good, passable and unreasonably deficient in quality; duplicate copies of the reports have been sent to you of the samples

classified as unreasonably deficient, to be sent to the druggists selling such samples, together with the warning, or other communication, from yourself; each druggist is thus placed in possession of the same full statement of the case against him as that upon which your action in the matter is based.

The canned peas and beans, all of American make, were found to be free from poisonous metals; the samples of kerosene, purchased especially in stores frequented by the poorer classes, were found to be up to the required standard, as to flashing point.

The following is the classification of my reports on the alkaloidal preparations:

Good	177
Passable	13
Unreasonably deficient	85

About thirty per cent of the whole number was therefore put in the last class; omitting the fifteen samples of poor tincture of opium, which preparation was included in my list for the first time this year, the percentage of unreasonably deficient samples would be reduced to about twenty-seven per cent against thirty-four per cent in 1888.

In the latter part of the year tincture of opium was added to the preparations examined by me; this if made strictly in accordance with the directions given in the United States Pharmacopœia for 1880, should contain 1.2 grams of morphia in 100 grams of tincture. It will be seen, in the tabulated statement of results that follows, that in many cases the strength of the preparation is far short of what it should be.

For the analysis a carefully weighed quantity of about sixty grams of the tincture is evaporated to dryness on a water bath kept at 85° Centigrade, and the residue is treated as directed in the United States Pharmacopœia, 1880, for the assay of opium, using precisely the proportions of lime, water, ammonium chloride, alcohol and ether there prescribed, with proper allowance for the fact that the quantity of tincture taken represents but about sixty-seventieths of the quantity of opium directed to be taken for the assay by that method. Every assay, thus far, has been made in duplicate with very close agreement in the results.

In the tabular statement, following, of the analytical results obtained, the figures given represent but the single assay that was made in those cases, where, by this assay, the sample was found to be reasonably good in quality. In all other cases the result given is the average of three assays, except in the case of tincture of opium, where only two analyses were made.

TABLE No. 1.

SULPHATE OF QUININE.

Number of sample.	History of the Sample.				Excess of foreign alkaloids as indicated by Kerner's test.
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by	
552	Dec. 26, 1888	R. S. Hambleton	Buffalo	Keasbey & Mattison	Much.
553	Dec. 28, 1888	J. B. Smith	Buffalo	Keasbey & Mattison	Much.
554	Dec. 26, 1888	Bouticou & Mosher	Buffalo	Powers & Weightman	None.
556	Dec. 27, 1888	H. J. Diamond	Buffalo	McKesson & Robbins	Much.
555	Jan. 19, 1889	J. L. Everitt	Elmira	Tarrant & Co	None.
596	Feb. 2, 1889	C. W. Lerch	Rochester	Lehn & Fink	Much.
597	Feb. 2, 1889	C. W. Wagener	Rochester	Keasbey & Mattison	Much.
612	March 11, 1889	J. A. Zobrist	Geneva	Keasbey & Mattison	None.
613	March 11, 1889	C. H. Sagar	Auburn	Keasbey & Mattison	None.
684	March 27, 1889	A. T. Veeder	Schenectady	Boehringer & Sohn	None.
685	March 25, 1889	Turner Bros.	Albany	McKesson & Robbins	Some.
686	March 25, 1889	A. B. Huested & Co.	Albany	Lazelle, Dalley & Co	Much.
687	March 27, 1889	George E. Duryee	Schenectady	Boehringer & Sohn	Much.
688	March 27, 1889	Drake & Moffitt	Troy	Keasbey & Mattison	None.
771	Nov. 1, 1889	Kenyon, Potter & Co	Syracuse	Boehringer & Sohn	Some.

TABLE No. 2.

CAPSULES OF QUININE SULPHATE.

Number of sample.	History of the Sample. Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by—	Gr'ns of Crystal'd Sulph. of Quinia per 100 Caps. Claimed.	Found.	Contains excess of foreign alkaloids, as indicated by Korner's test.
538	Dec. 27, 1888	G. W. Coleman	Buffalo	G. W. Coleman	200	180.1	....
561	Feb. 1, 1889	W. P. Colvin	Rochester	W. P. Colvin	200	249.3	....
582	Feb. 1, 1889	S. A. Merriam	Rochester	S. A. Merriam	200	234.9	....
585	Feb. 2, 1889	Dake Bros	Rochester	Dake Bros	200	196.6	....
587	Feb. 1, 1889	C. E. Thrall	Rochester	C. E. Thrall	200	198.2	....
588	Feb. 1, 1889	Ballard & Hurlburt	Rochester	Ballard & Hurlburt	200	211.9	....
598	March 11, 1889	Lewis Hunt	Auburn	Lewis Hunt	200	232.9	....
602	March 11, 1889	E. M. Maynard	Geneva	E. M. Maynard	500	389.7	....
603	March 11, 1889	C. H. Sagar	Auburn	C. H. Sagar	300	328.5	....
604	March 11, 1889	W. M. Smith	Auburn	W. M. Smith	300	243	....
621	March 25, 1889	Wm. Sautter	Albany	Parke, Davis & Co	200	247.4	....
625	March 27, 1889	W. F Hanson & Co	Schenectady	W. F. Hanson & Co	200	248	....
627	March 27, 1889	Wendell & Becker	Amsterdam	Wendell & Becker	200	209.4	....
628	March 26, 1889	C. H. Wiberly	Troy	Parke, Davis & Co	200	221.7	....
646	March 26, 1889	E. F. Leahy	Troy	E. F. Leahy	200	257.4	....
647	March 25, 1889	H. B. Clement & Co	Albany	Keasbey & Mattison	200	198.4	....
653	March 28, 1889	F. T. Ray & Co.	Utica	F. T. Ray & Co	200	200.6	....
668	March 27, 1889	M. W. Reid	Amsterdam	M. W. Reid	200	260	....
676	March 28, 1889	George L. Hill	Utica	George L. Hill	200	270	....
677	March 27, 1889	William Sauter	Schenectady	William Sauter	300	292.2	....
700	Sept. 19, 1889	Lyman & Jeffrey	Buffalo	Lyman & Jeffrey	200	197	....
702	Sept. 19, 1889	Stoddard Bros.	Buffalo	Keasbey & Mattison	300	295.8	....

715	Sept. 20, 1889	Rieffenstahl Bros	Buffalo	Rieffenstahl Bros	200	269.8	....
716	Sept. 21, 1889	E. J. Smith	Buffalo	E. J. Smith	200	210.0	....
717	Sept. 19, 1889	Boutecou & Mosher	Buffalo	Upjohn Pill & Granule Company	200	192.7	....
723	Sept. 20, 1889	Charles A Drefs	Buffalo	Charles A. Drefs	500	389.2	None.
725	Sept. 20, 1889	W. G. Gregory	Buffalo	W. G. Gregory	500	551	....
726	Sept. 20, 1889	W. S. O'Brien	Buffalo	W. S. O'Brien	500	509.2	....
728	Sept. 19, 1889	J. P. & J. W. Diehl	Buffalo	J. P. & J. W. Diehl	200	183.7	Much.
729	Sept. 20, 1889	Denny & Field	Buffalo	Denny & Field	200	188.9	....
733	Sept. 19, 1889	Damback & Co	Buffalo	Damback & Co	200	188.9	None.
734	Sept. 21, 1889	Edward Dwyer	Buffalo	Edward Dwyer	200	218.8	....
743	Nov. 1, 1889	Coogan & Quigley	Syracuse	Coogan & Quigley	500	462	Much.
748	Nov. 2, 1889	F. C. Joslin & Co	Syracuse	F. C. Joslin & Co	500	369.6	Some.
749	Nov. 1, 1889	M. G. Spalding	Syracuse	M. G. Spalding	500	50.8	Very much.
768	Nov. 1, 1889	E. W. Thomas	Syracuse	E. W. Thomas	200	51	Very much.
783	Nov. 30, 1889	W. P. Colvin	Rochester	W. P. Colvin	200	171.6	None.
784	Nov. 29, 1889	R. W. Chambers	Rochester	R. W. Chambers	200	162.3	None.

TABLE No. 3.

PILLS OF SULPHATE OF QUININE.

Number of sample.	History of Sample.				Gr'ns of Crystal'd Sulph. of Quinia per 100 Pills.		Contains excess of foreign alkaloids, as indicated by Kerner's test.
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by—	Claimed.	Found.	
520	Dec. 27, 1888	Peterson Bros.	Buffalo	W. R. Warner & Co.	100	90	....
521	Dec. 26, 1888	F. J. Barron	Buffalo	McIntyre & Embury.	200	162.3	....
522	Dec. 26, 1888	G. Rodenback	Buffalo	Lehn & Fink	200	198.3	....
523	Dec. 27, 1888	A. E. Romer	Buffalo	L. J. Finch	*200	*227.1	....
524	Dec. 26, 1888	C. O. Rano	Buffalo	McKesson & Robbins	200	164.9	....
525	Dec. 26, 1888	C. A. Diamond	Buffalo	Sharp & Dohme	200	188.1	....
526	Dec. 28, 1888	C. A. Drefs	Buffalo	Thayer & Co	200	198.6	....
527	Dec. 27, 1888	N. McEachren	Buffalo	Keasbey & Mattison.	200	165.8	....
534	Dec. 29, 1888	D. W. Brandt.	Batavia	Keasbey & Mattison.	200	163.1	....
535	Dec. 29, 1888	G. E. Sykes	Buffalo	Keasbey & Mattison.	100	91.1	....
536	Dec. 26, 1888	E. H. Beaman	Buffalo	Keasbey & Mattison.	200	194.8	....
537	Dec. 26, 1888	C. W. Armstrong	Buffalo	Sharpe & Dohme	200	190.6	....
539	Dec. 28, 1888	Moore & Hubbard	Buffalo	W. R. Warner & Co.	100	90.	....
540	Dec. 27, 1888	Geo. Reimann	Buffalo	McIntyre & Embury.	200	194.1	....
541	Dec. 26, 1888	Mrs. J. Keller	Buffalo	McKesson & Robbins	300	306.5	....
542	Dec. 27, 1888	S. A. Dustin	Batavia	Norwich Pharmacy Company	100	85.5	....
543	Dec. 29, 1888	W. B. Hoff	Buffalo	McKesson & Robbins	200	202.1	....
548	Jan. 19, 1889	Davis & Weightman	Elmira	McIntyre & Embury.	200	153	....
549	Jan. 19, 1889	J. F. Van Nort	Elmira	McIntyre & Embury.	300	296.8	....
557	Feb. 2, 1889	Henry Kobbe	Rochester	Henry Kobbe	200	122.4	....
550	Jan. 19, 1889	Joseph Meyer	Elmira	W. R. Warner & Co.	300	274.7	....

558	Feb. 2, 1889	J. M. Schmitt	Rochester	J. M. Schmitt	200	206.1	....
559	Feb. 1, 1889	Czar Dunning	Rochester	Czar Dunning	200	200.7	....
560	Feb. 2, 1889	W. J. Sibley & Co.	Rochester	W. J. Sibley & Co.	200	71.6	....
562	Feb. 2, 1889	G. Mannel	Rochester	G. Mannel	200	192.4	....
563	Feb. 1, 1889	N. Barrowclough	Rochester	Keasbey & Mattison	200	199.7	....
564	Feb. 1, 1889	Curran & Goler	Rochester	Curran & Goler	200	223.7	....
571	Feb. 1, 1889	J. F. Burkard	Rochester	J. F. Burkard	500	530.7	....
572	Feb. 1, 1889	Henry Aman	Rochester	Henry Aman	200	74.5	....
574	Jan. 19, 1889	Gerity Bros	Elmira	W. R. Warner & Co.	500	472.5	....
575	Jan. 19, 1889	J. F. Van Nort	Elmira	Keasbey & Mattison	200	190.8	....
576	Jan. 19, 1889	C. P. Pettit	Elmira	McIntyre & Embury	200	205.2	....
577	Feb. 2, 1889	John Jardene	Rochester	John Jardene	200	206.6	....
578	Feb. 1, 1889	S. A. Newman	Rochester	S. A. Newman	300	229.2	....
579	Feb. 2, 1889	J. P. Irish	Rochester	Keasbey & Mattison	300	292.8	....
580	Feb. 1, 1889	L. Klinzing	Rochester	W. R. Warner & Co.	300	282	....
581	Feb. 1, 1889	H. Fellman	Rochester	H. Fellman	300	322	....
583	Feb. 1, 1889	E. H. Davis & Co.	Rochester	E. H. Davis & Co.	300	315	....
584	Feb. 1, 1889	G. H. Haass	Rochester	G. H. Haass	200	216.7	....
586	Feb. 1, 1889	O. J. & J. A. Bryan	Rochester	O. J. & J. A. Bryan	200	211.6	....
589	Feb. 1, 1889	F. L. Zimmerman	Rochester	Keasbey & Mattison	300	279.4	....
590	Feb. 1, 1889	F. L. Hewitt	Rochester	W. R. Warner & Co.	300	235	....
591	Feb. 1, 1889	C. F. Maid	Rochester	Frazer & Co	300	288.6	....
592	Feb. 2, 1889	C. N. Braman	Rochester	Upjohn Pill and Granule Company.	200	203.2	....
593	Feb. 2, 1889	G. W. Johns	Rochester	Upjohn Pill and Granule Company.	200	194.7	....
594	Jan. 19, 1889.	Ingham Bros	Elmira	Upjohn Pill and Granule Company.	200	195.8	....
599	March 11, 1889	Henry A. Adam	Auburn	Eli Lilly & Co.	200	188.8	....
600	March 11, 1889	W. H. Partridge	Geneva	L. J. Finch	200	211.4	....

* Bi-sulphate.

TABLE No. 3 (*Continued*).

Sample number.	History of the Samples.			Said to be put up by	Grains of Crystal'd Sulph. of Quinia per 100 Pills.		Contains excess of foreign alkaloids as indicated by Kerner's test.
	Date of collection.	Of whom purchased.	Where purchased.		Claimed.	Found.	
601	March 11, 1880	E. M. Maynard	Geneva	J. E. Moore	100	98 6	......
605	March 11, 1880	Osborn Chemical Co	Auburn	Keasbey & Mattison	200	150 1	......
622	March 25, 1880	J. M. Bandorf	Albany	E. R. Squibbs	300	320 6	......
623	March 26, 1880	F. J. Smith	Albany	Sharpe & Dohme	200	194 9	......
624	March 26, 1880	A. B. Huested & Co	Albany	A. B. Huested & Co	200	213 8	......
626	March 26, 1880	S. C. Hodgkins	Albany	Keasbey & Mattison	200	180 2	......
635	March 26, 1880	C. H. Gaus	Albany	Keasbey & Mattison	200	208 1	......
636	March 26, 1880	L. A. Shuland	West Troy	L. J. Finch	300	272 1	None.
637	March 26, 1880	W. B. Haley	Albany	J. E. Moore	200	196 3	......
638	March 26, 1880	George Boucher	Albany	Sharp & Dohme	200	197	......
640	March 27, 1880	N. H. Kittle	Schenectady	Keasbey & Mattison	200	199 6	......
643	March 26, 1880	A. L. George	Albany	H. Thayer & Co	200	163 5	Much.
651	March 26, 1880	R. P. Tunnard	West Troy	Thompson & Son	200	188 4	......
655	March 26, 1880	Rowe & Donnelly	Troy	Keasbey & Mattison	200	182 3	......
656	March 26, 1880	W. E. Maston	Albany	Hall & Ruckle	300	280 6	......
660	March 26, 1880	Bassett & Brunaghun	Albany	Upjohn Pill and Granule Company	200	198 4	......
661	March 27, 1880	E. W. Clark	Amsterdam	Keasbey & Mattison	200	191 9	......
662	March 27, 1880	C. H. Shackleton	Troy	L. J. Finch	200	178 7	Slight.
663	March 26, 1880	Otto Scholz	Albany	Keasbey & Mattison	200	188 2	None.
664	March 26, 1880	E. F. Hunting	Albany	Upjohn Pill and Granule Company	200	191	......
665	March 26, 1880	R. H. Starbuck	Troy	Thompson & Son	200	182 4	None.
669	March 26, 1880	William Brown	Cohoes	Keasbey & Mattison	300	294 1	......

670	March 26, 1889	M. McDermott	Cohoes	J. E. Moore	100	98.3	....
671	March 26, 1889	George Hutchison	West Troy	J. E. Moore	200	198.8	....
672	March 26, 1889	D. S. Dodge	Cohoes	Keasbey & Mattison	200	192.8	....
673	March 26, 1889	E. G. Mussay	Cohoes	W. R. Warner & Co.	200	198.6	....
674	March 26, 1889	J. E. Miller	West Troy	H. Thayer & Co	300	313.9	....
675	March 25, 1889	W. E. Masten	Albany	Keasby & Mattison	200	176.5	....
678	March 25, 1889	Turner Bros	Albany	H. Thayer & Co	200	196.2	....
679	March 28, 1889	J. H. Sheehan & Co	Utica	J. E. Moore	300	236.5	Much.
680	March 27, 1889	G. Steinfuhrer	Schenectady	Keasbey & Mattison	200	180.7	None.
681	March 27, 1889	George Duryee	Schenectady	Keasbey & Mattison	500	505.5	....
682	March 26, 1889	Dalrymple & Warner	Albany	L. J. Finch	200	189.5	....
683	March 27, 1889	Bradford & Dickinson	Amsterdam	L. J. Finch	200	205.7	....
689	March 27, 1889	J. G. Calkins	Cohoes	W. R. Warner & Co.	200	192.2	....
701	Sept. 20, 1889	George E. Sykes	Buffalo	George E. Sykes	200	208.9	....
704	Sept. 19, 1889	T. M. Johnson	Buffalo	Keasbey & Mattison	500	475.3	....
705	Sept. 19, 1889	C. Rodenback	Buffalo	Lehn & Fink	200	175.2	Much.
706	Sept. 19, 1889	Blackney & Co	Buffalo	McIntyre & Embury	500	479.3	None.
718	Sept. 19, 1889	W. H. Borgett	Buffalo	Sharpe & Dohme	200	183.8	Much.
719	Sept. 19, 1889	F. J. Barron	Buffalo	McIntyre & Embury	200	205.8	....
722	Sept. 21, 1889	McArthur & Co	Buffalo	Sharpe & Dohme	200	201.5	....
724	Sept. 20, 1889	E. G. Boysen	Buffalo	Parke, Davis & Co	100	101.3	....
727	Sept. 21, 1889	E. J. Liebetrut	Buffalo	Keasbey & Mattison	100	93.2	....
730	Sept. 19, 1889	Ellwood & Thompson	Buffalo	Ellwood & Thompson	200	109	Much.
731	Sept. 21, 1889	R. K. Smither	Buffalo	R. K. Smither	200	185	None.
732	Sept. 20, 1889	William Coulson	Buffalo	Keasbey & Mattison	200	204	....
735	Sept. 20, 1889	Dr. Wiggins	Buffalo	W. R. Warner & Co.	200	168.6	....
736	Sept. 21, 1889	A. E. Romer	Buffalo	H. Thayer & Co	300	328	Much.
779	Nov. 29, 1889	C. E. Stevens	Rochester	Keasbey & Mattison	200	171.8	Some.
780	Nov. 29, 1889	A. B. Chamberlain	Rochester	W. R. Warner & Co.	200	185	Much.

TABLE No. 4.

CITRATE OF IRON AND QUININE.

Number of sample.	History of the Sample.				Assay—per cent of quinia found.	Contains excess of foreign alkaloids as indicated by Kerner's test.
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by—		
545	Dec. 27, 1888	Stoddard Bros.	Buffalo	Billings, Clapp & Co.	9.36	....
546	Dec. 27, 1888	P. Kuhles	Buffalo	McIntyre & Embury	7.39	....
547	Dec. 26, 1888	A. C. Anthony	Buffalo	Keasbey & Mattison	11.36	....
595.	Feb. 1, 1889	R. W. Chambers & Co	Rochester	McKesson & Robbins	9.09	....
610	March 19, 1889	C. H. Sagar	Auburn	Billings, Clapp & Co.	9.65	....
611	March 11, 1889	M. L. Walley & Co	Auburn	Lazelle, Dalley & Co.	9.79	....
639	March 28, 1889	Wm. Blaikie	Utica	C. F. White & Co.	9.35	....
640	March 25, 1889	Chas. Van Loon	Albany	Chas. Pfizer & Co	11.52	....
649	March 26, 1889	D. F. Magill	Troy	Billings, Clapp & Co.	10.46	Much.
650	March 26, 1889	Wm. Brown	Cohoes	Billings, Clapp & Co.	9.26	Much.
666	March 26, 1889	Wm. Palmatier	Albany	Chas. Pfizer & Co	11.47	Much.
667	March 25, 1889	E. T. Rice	Albany	Chas. Pfizer & Co	10.15	Much.
738	Sept. 20, 1889	P. Kuhles	Buffalo	McIntyre & Embury	7.41	Much.
822	Nov. 29, 1889	Curran & Goler	Rochester	Lehn & Fink	9.15	Some.

TABLE No. 5.

PILLS OF SULPHATE OF MORPHINE.

Number of sample.	History of the Sample.				Gr'ns of Crystal'd Sulp. of Morphia per 100 Pills.	
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by—	Claimed.	Found.
528	Dec. 26, 1888	Blackney & Co.	Buffalo	McIntyre & Embury	25	22.18
529	Dec. 26, 1888	W. H. Chase	Buffalo	W. S. Merrill & Co.	25	11.04
530	Dec. 28, 1888	O. Rydstrom	Buffalo	Parke, Davis & Co	25	21.09
531	Dec. 29, 1888	Moore & Hubbard	Buffalo	W. R. Warner & Co.	25	25.15
532	Dec. 26, 1888	R. S. Hambleton	Buffalo	Keasbey & Mattison	25	18.2
533	Dec. 29, 1888	Dudley & Cooley	Batavia	Parke, Davis & Co.	12.5	12.04
551	Dec. 27, 1888	J. J. Matthews	Buffalo	Parke, Davis & Co.	25	23.14
544	Jan. 19, 1889	Davis & Wightman	Elmira	Upjohn Pill and Granule Co.	25	25.27
565	Feb. 2, 1889	Charles W. Lerch	Rochester	H. Thayer & Co.	25	21.49
566	Feb. 2, 1889	Taylor & Jeffards	Rochester	W. R. Warner	12.5	11.11
567	Feb. 1, 1889	E. H. Davis & Co.	Rochester	Upjohn Pill and Granule Co.	25	22.12
568	Feb. 2, 1889	Henry Kobbe	Rochester	H. Thayer & Co.	25	23.5
570	Feb. 1, 1889	Czar Dunning	Rochester	W. R. Warner & Co.	25	21.9
573	Feb. 1, 1889	C. F. Maid	Rochester	Keasbey & Mattison	12.5	10.30
609	March 11, 1889	J. A. Zobrist	Geneva	Keasbey & Mattison	25	22.26
629	March 26, 1889	R. P. Tunnard	West Troy	J. E. Moore	12.5	10.95
630	March 27, 1889	A. T. Veeder	Schenectady	Keasbey & Mattison	25	18.42
631	March 25, 1889	H. B. Clement & Co.	Albany	Hazard, Hazard & Co	25	21.7
632	March 27, 1889	Joseph Donnelly	Amsterdam	J. E. Moore	25	20.8
633	March 25, 1889	L. Sautter	Albany	Keasbey & Mattison	25	21.75
634	March 28, 1889	Luce & Plumb	Utica	H. Thayer & Co	25	24.4
641	March 27, 1889	C. W. Striker	Amsterdam	J. E. Moore	25	25.28

TABLE 5 — PILLS OF SULPHATE OF MORPHINE — (*Concluded*).

Number of sample.	History of the Sample.				Gr'ns of Crystal'd Sulp. of Morphia per 100 Pills.	
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by	Claimed.	Found.
643	March 27, 1889	J. S. Teneyck	Cohoes	W. H. Schieffelin & Co	25	23.07
644	March 26, 1889	J. E. Miller	West Troy	Parke, Davis & Co	12.5	13.30
652	March 26, 1889	Arbor Hill Drug Company	Albany	McKesson & Robbins	25	22.34
657	March 27, 1889	Dr. G. Steinfuhrer	Schenectady	J. E. Moore	25	24.17
658	March 26, 1889	Charles H. Schaefer	Albany	Henry Thayer & Co	12.5	12.6
708	Sept. 20, 1889	Smiths Drug Store	Buffalo	W. R. Warner & Co	25	23.12
709	Sept. 19, 1889	C. A. Drefs	Buffalo	Henry Thayer & Co	25	20.25
711	Sept. 19, 1889	Blackney & Co	Buffalo	McIntyre & Embury	50	38.32
721	Sept. 20, 1889	H. V. Roess	Buffalo	McIntyre & Embury	25	19.6
754	Nov. 2, 1889	J. C. Auchampaugh	Syracuse	Upjohn Pill and Granule Co	25	20.05
787	Nov. 30, 1889	Henry Follman	Rochester	W. R. Warner & Co	25	20.09
788	Nov. 29, 1889	Strassenburgh & Steele	Rochester	L. J. Finch	25	17.77
790	Nov. 29, 1889	Ballard & Hurlbut	Rochester	Upjohn Pill and Granule Co	25	18.34

TABLE No. 6.

HYPODERMIC TABLETS OF MORPHINE SULPHATE.

Number of sample.	History of the Sample.				Grains of Crystallized Morp. Sulp. per 100 Tablets.	
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by—	Claimed.	Found.
567	Feb. 1, 1889	E. H. Davis & Co	Rochester	Upjohn Pill and Granule Co	25	22.12
569	Feb. 1, 1889	Curran & Goler	Rochester	Hazard, Hazard & Co	25	23
606	March 11, 1889	M. L. Walley & Co	Auburn	John Wyeth & Bro	12.5	11.5
607	March 11, 1889	Dr. A. L. Sweet	Geneva	Fraser & Co	25	19.73
608	March 11, 1889	W. M. Smith	Auburn	Fraser & Co	25	20.05
642	March 27, 1889	A. M. Knowlson	Troy	Fraser & Co	12.5	11.43
651	March 26, 1889	Wm. Archibold & Son	Cohoes	Hazard, Hazard & Co	12.5	10.85
659	March 25, 1889	Bassett & Brumagham	Albany	A. B. Huested & Co	25	21.37
710	Sept. 19, 1889	T. M. Johnson	Buffalo	Fraser & Co	25	19.95
712	Sept. 19, 1889	Ellwood & Thomson	Buffalo	Hazard, Hazard & Co	25	21.94
720	Sept. 19, 1889	F. J. Barron	Buffalo	Hazard, Hazard & Co	25	22.22
751	Nov. 2, 1889	W. D. Tallman	Syracuse	W. D. Tallman	25	17.88

TABLE No. 7.

TINCTURE OF OPIUM.

Number of sample.	History of the Sample. Date of collection.		Of whom purchased.	Where purchased.	Said to be put up by	Grains of morphine per fl. ounce of tincture
766	Nov.	2, 1889	Robert Bodden	Syracuse	Robert Bodden	0 6
773	Sept.	21, 1889	J. C. Landscheft	Buffalo	J. C. Landscheft	0 84
775	Sept.	21, 1889	R. K. Smither	Buffalo	R. K. Smither	0 75
777	Sept.	21, 1889	E. J. Liebetrut	Buffalo	E. J. Liebetrut	0 6
792	Nov.	2, 1889	W. D. Tallman	Syracuse	W. D. Tallman	0 82
794	Nov.	2, 1889	F. C. Joslyn & Co.	Syracuse	F. C. Joslyn & Co.	0 78
795	Nov.	1, 1889	Corsaw & Barnum	Syracuse	Corsaw & Barnum	0 57
796	Nov.	1, 1889	E. W. Thomas	Syracuse	E. W. Thomas	0 78
797	Nov.	1, 1889	T. H. Kempter	Syracuse	T. H. Kempter	0 54
806	Nov.	1, 1889	Coogan & Quigley	Syracuse	Coogan & Quigley	0 60
812	Nov.	30, 1889	J. & J. Cooper	Rochester	J. & J. Cooper	0 60
813	Nov.	30, 1889	G. H. Haass	Rochester	G. H. Haass	0 85
814	Nov.	1, 1889	W. P. Bissell	Syracuse	W. P. Bissell	0 80
817	Nov.	30, 1889	C. E. Thrall	Rochester	C. E. Thrall	0 60
819	Nov.	29, 1889	Ballard & Hurlburt	Rochester	Ballard & Hurlburt	0 62

TABLE No. 8.

CANNED PEAS.

Number of sample.	History of the Sample.				Remarks.		
	Date of collection.	Of whom purchased.	Where purchased.	Said to be put up by—	Tin.	Lead.	Copper.
614	March 11, 1889	W. D. Fuller	Auburn	Erie Canning Co	No	No	No.
615	March 11, 1889	T. E. Davis	Auburn	Frankville Canning Co.	.....	Trace of	.....
616	March 11, 1889	A. L. Dewdney	Auburn	Curtice Bros	No	No	No.
617	March 11, 1889	A. B. Roe	Geneva	F. Bryson	No	No	No.
618	March 11, 1889	H. D. Pachin	Geneva	Kraft & Winnebrener	No	No	No.
			CANNED BEANS.				
619	March 11, 1889	J. W. Hubbard	Auburn	A. Booth	No	No	No.
620	March 11, 1889	McGirvin & Murray	Auburn	H. F. Hemingway & Co.	No	No	No.

TABLE NO. 8. KEROSENE OIL.

No.	History of the Samples			Flashing point.
	Date of collection.	Of whom purchased.	Where purchased.	
690	March 10, 1889	Wm. H. Van Dyne	Cayuga	102° F.
691	March 10, 1889	J. H. Van Sickle	Cayuga	103° F.
[illegible]	March 10, 1889	J. P. Barclay	Auburn	102° F.
[illegible]	March 10, 1889	Wm. Knight	Geneva	102° F.
694	March 10, 1889	G. W. McDougall	Geneva	104° F.

In my determination of quinine in preparations containing this alkaloid, I use, as stated in previous reports, ether instead of chloroform as the solvent of the alkaloid precipitated by sodium hydrate, for the reason that its use is far more convenient in the form of apparatus used by me and described in previous reports, than is the use of chloroform in a separatory funnel, while at the same time the ether effects the solution of the precipitate quickly and perfectly. Exception has been taken by one manufacturing firm to the use of this solvent, since chloroform is prescribed in the United States Pharmacopœia, in the assay of citrate of iron and quinine. But it has been shown by tests of my own (Sixth Annual Report New York State Board of Health), that using ether as the solvent, and even with ammonia as the precipitant instead of sodium hydrate, a weight of alkaloidal residue is obtained equal to from 98.6 to 100 per cent of the weight of quinia present; using sodium hydrate as the precipitant, in the excess of which the quinia is regarded as less soluble than in ammonia, like results have been obtained in very recent tests made in this laboratory. These results take away all ground for the assertion that the results will be too low with ether as the solvent.

Further, it appears to be very plain that the chloroform takes up much more of impurities from the solution of citrate of iron and quinine in which the quinia is precipitated than the ether does; in the latter case, this residue is usually nearly white, like that obtained from a solution of the sulphate in acidified water, and is in any case, so far as my experience goes, much lighter colored than the residue from the evaporation of the chloroform solution; this when dried at the usual temperature in my practice, 105° Centigrade, is sometimes almost black. This observation may account for the higher results obtained by the chloroform method in certain disputed cases, than my results by the ether method. I propose to give this matter further investigation.

Some tests were made during the year comparing the use of sodium hydrate in the presence of tartaric acid, and ammonia, as precipitants, in the assay of citrate of iron and quinine, with the following results, giving the per cent of quinia found:

	Sodium hydrate.	Ammonium hydrate.
No. 503	10.47 10.29 10.38	10.78
No. 505	9.24	9.41 9.46 9.46
No. 507	10.98	11.45
No. 610	9.46	9.88 9.77 9.29
No. 611	9.55	9.69 9.81 9.88
No. 649	10.87	10.29 10.40 10.68
No. 650	9.67	9.24 9.18 9.37
No. 667	11.09 11.13 11.18	11.47

The differences between the results by the two methods are in general insignificant, and are on the whole in favor of the ammonia for higher figures. The use of ammonia is in many cases much more convenient, since the solution by ether of the precipitated alkaloid is sometimes very much more easy than when sodium hydrate is used.

It having been claimed by certain aggrieved parties that, when quinine is precipitated from the sólution of its sulphate and taken up by ether, the dried residue from this solution dissolved by sulphuric acid, and the sulphate obtained again by crystallization from this solution, this product may give the reaction for excess of foreign alkaloids by Kerner's test, when the original sulphate would not. In order to avoid doing any possible injustice in the matter, this test has been omitted till the truth or falsity of this assertion could be proved by experiments in my laboratory.

Fifteen different pill masses were made from different samples of quinine sulphate that gave no reaction with Kerner's test; the residue of quinia obtained by precipitation with sodium hydrate from the solution of each of these pill masses, and extraction with ether, was dissolved in dilute sulphuric acid, the solution was nearly neutralized with ammonia and allowed to crystallize. The

sulphate thus obtained was collected on a filter, dried, and subjected to Kerner's test, precisely as described in my report for 1886. (Seventh Annual Report, New York State Board of Health, p. 438.) In no case was any reaction obtained.

Ten samples of citrate of iron and quinine, prepared also from sulphate of quinine that gave originally no reaction with Kerner's test, were treated in a similar manner and with like results.

It may be considered as satisfactorily established by the results of these twenty-five tests, that if in the manufacture of pills of sulphate of quinine, or of citrate of iron and quinine, a quinia salt is used that will give no reaction for excess of foreign alkaloids with Kerner's test, the recrystallized sulphate prepared in the manner described above, from the quinia weighed in my assays will not give the reaction; and that if it does give the reaction, the inference is a fair one, that the salt used in the preparation of the sample would itself have shown evidence of excess of foreign alkaloids.

A large number of samples of capsules of sulphate of quinine have been examined in the course of the past year; some of the results show what might be expected from the manner in which the capsules are sometimes filled, that the quantity of the salt contained in different capsules put up in the same pharmacy, in some cases varies so widely that the variation may be a matter of considerable importance, to say nothing of the often-times serious deficiency or great excess in amount. Three different assays of one two-grain sample gave 172, 192 and 202 grains of sulphate per hundred capsules; of another, a three-grain sample 269, 363 and 352 grains per hundred capsules; of another, five-grain, 497, 465 and 423 grains per hundred capsules; of another five-grain, 348, 392 and 368 grains, instead of 500 claimed; of another five-grain, 61, 49 and 43 grains, instead of 500, and so on. That the fault was in the capsules and not in the analysis, was shown by the fact that if a large number of them were dissolved up together, and carefully weighed portions of this solution were analyzed, closely agreeing results were obtained.

Concerning citrate of iron and quinine, some druggists make it according to the Pharmacopœia of 1870, requiring that it shall contain but ten per cent of quinia. A similar course appears to be followed in some cases in regard to tincture of opium, which the later Pharmacopœia requires to be of a higher strength than

the older one demands. Further, some druggists use the gum opium, or sometimes what they call purified opium, in making the tincture, instead of the powdered opium as required by the Pharmacopœia of 1880. To avoid any ambiguity in the requirement in section 3 a 1 of the Act to prevent the adulteration of food or drugs, chapter 407, Laws of 1881, which might be used as a cover for incorrect practice, I would suggest that for the word "therein" the words "in the latest authorized edition thereof" be substituted.

In other respects the law seems to me adequate for its purpose, and only to need enforcement to make it respected. The mere complaints preferred by druggists who have been warned against the manufacturers who have sold them preparations of poor quality, have of themselves accomplished something in the way of improvement in the general quality of some of these preparations. But if a second, or even a third warning sent to the same druggist, means just a warning and nothing more, he may come to regard the whole procedure as devoid of danger to him and go on selling the same articles, or some other articles of low quality. I might call attention, in illustration of this point, to the case of the poorest of all the samples of citrate of iron and quinine in the list reported for this year, which was collected twice at two dates, nine months apart, of the same druggist in Buffalo, the two samples yielding practically the same results on analysis. I was not aware of their relationship till the results came together in the same table.

As to the scope of the work in my department, I have nothing to add to what was given under this head in my preceding report. So far as time has permitted I have extended my [illegible] this year. [illegible] large part of the work [illegible] I think [illegible] the statement [illegible] that some druggists sell as many as 2[illegible] pills [illegible] and that [illegible] the estimate made of the [illegible] ordinary business.

Respectfully submitted,

G. C. [illegible]

[illegible]

CORNELL UNIVERSITY, ITHACA, N. Y., [illegible]

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NEW BRIGHTON, N. Y., *November* 29, 1889.

LEWIS BALCH, M. D., *Secretary New York State Board of Health:*

SIR.— According to instructions I have prepared the following memorandum upon my inspections during the present year on Newtown creek and Barren island:

Each establishment was visited, on an average, about three times a month until September, when the inspections ceased. No inspections were made on the Brooklyn side of Newtown creek, or on the east side within the limits of Long Island City. Hence the region included in my tours of inspection was only on the east side of the creek, between Penny bridge and Metropolitan avenue.

The following establishments are there located:

1. Fred. Hoefner, offal and fat rendering.
2. Reed & Co., superphosphates.
3. G. H. Nichols & Co., Laurel Hill chemical works.
4. C. Hildebrand, offal and fat rendering.
5. A. Zimmerman, offal and fat rendering.
6. A. Wissel & Co., offal and fat rendering.
7. Henry Beran, offal and fat rendering.
8. M. Rosenheim & Co., fat and oil refiners.
9. E. Clark, fat rendering.
10. Möller & Co., bone black, etc.
11. Cord Meyer, Jr., bone black, etc.
12. Geo. Ackerman, offal and fat rendering.
13. J. Barnett & Co., starch.

Nos. 6, 10 and 11 were the ones requiring most attention. They are the only ones whose effects are far reaching, all the others being mere local nuisances, and most of them only working occasionally.

No. 11 has always shown a praiseworthy determination to do all that was possible to mitigate the nuisances arising, and the plant has never been allowed to run down. No. 10 had a pretty fair plant a year since, but it is now out of repair, especially the

saturator and its connections. No. 6 needs condensers for the rendering kettles, and they should be forced to put them in and introduce all other details to perfect their plant, as they do a large business, having the offal contract for the city of Brooklyn. I have yet to hear of any activity having been shown by the board of health of the town of Newtown, or of their having taken any steps to abate or control any of the offensive conditions.

I am pleased to state that bulkheading and dredging the creek continues, and every new piece of such work tends to mitigate the evil of the sewage saturated waters. These headwaters will, however, never be anything but a nuisance so long as sewage is permitted to discharge into them. I regret to observe that Brooklyn is growing more and more in the direction of this part of the creek and that the sewage evil is constantly augmenting in spite of the large intercepting sewer which was constructed some time since with the intention of accommodating the refuse of this section.

On Barren island, which is under the jurisdiction of the town board of Flatlands, the following industries are located:

14. Friedlaender's fish factory.
15. White's horse factory and cattle yards.
16. Steinfel's fish factory.
17. Coe's fertilizer works.

The latter ceased work in June and did not begin again until September. The first named was almost wiped out by the great storm of September tenth and eleventh.

White's place has always been an object of solicitude and I am glad to say that great improvement has been made, both in the capacity of the plant and in the general cleanliness of the premises. One special inspection was made, in the summer, to endeavor to trace an alleged nuisance from garbage on Newtown creek. The only localities where garbage dumping was found to be in progress were in Brooklyn and Long Island City, hence the investigation was not continued any further. It is my opinion that still greater improvement could be made if the local boards of health would insist on having the necessary regulations carried out.

Respectfully submitted.

ARTHUR HOLLICK,
Inspector.